FOOD MANUFACTURE
Incorporating Food Industries Weekly
RD HILL LIMITED, STRATFORD HOUSE, 9 EDEN STREET, LONDON, N.W.1 APRIL 1, 195

GOODELL LIBRARY
APR 18 1955
UNIVERSITY OF MASSACHUSETTS

CLARK'S CARAMEL FOR COLOUR

rtment Food Technology
versity of Massachusetts
erst, Massachusetts

The reason for using Caramel is that it is a Pure Burnt Sugar colouring free from all artificial dyes. *The art of using Caramel* is to choose the correct grade for a specific purpose. A wrong choice may result in sediment being formed in products which should remain brilliant. Alternatively, when clarity is not important, a Caramel with the highest possible colouring power should be used for the sake of economy.

The Clark Research Laboratories will be pleased to advise you on the correct use of Caramel.

GRADE OF CARAMEL	FOR
8,000	Gravy Browning, Gravy Salt, Vinegar
MANUFACTURING (60,000)	Pickles, Sauces, Mincemeat, Xmas Puddings
P.	Pickled Onions (non-staining)
AKERY	Brown Bread, Cakes
D.	Kola, Dandelion & Burdock, Ginger Ale, etc.
V.B.	Cider, Wines, Spirits
OCHA D (Coffee flavour)	Fillings, Icings, Fondants, Coffee Extract
WDER	Powder Mixes (Blancmange & Cake & Pudding Mixes)
WDER (Mocha)	Powder Mixes requiring a coffee flavour

Department Food Technology
University of Massachusetts
Amherst, Massachusetts

SOLE WORLD DISTRIBUTORS OF CLARK'S CARAMEL PRODUCTS

G. HAVINDEN LIMITED

71 BAKER STREET, LONDON, W.1. WELbeck 2814 'Grams: NEDNIVAH LONDON

South Africa: G. HAVINDEN (PTY) LTD., P.O. BOX 2553, Durban

"SILVER FOX" . . . *the metal of the age*

Registered Trade Marks

STAINLESS STEEL

In the preparation of foodstuffs, scrupulous attention to cleanliness is essential. That is why this modern plant for the production of margarine makes extensive use of "Silver Fox" Stainless Steels for all metal parts in contact with the product. Freedom from contamination and ease of cleaning are but two of the many advantages of "Silver Fox" Stainless Steels.

The colour photograph—taken in the process room of the Stork Margarine Works—is reproduced by courtesy of Messrs. Van den Berghs and Jurgens Limited.

THE UNITED STEEL COMPANIES LTD

SAMUEL FOX & COMPANY LIMITED

Associated with The United Steel Companies Limited

STOCKSBRIDGE WORKS · Nr. SHEFFIELD · ENGLAND

"It's all works and no space!"

said the Works Manager

He didn't look good at all. All the marks of a long spell of strain. "For months I've been doing the impossible", he bawled, as we threaded our way through the factory. "And because I did it last time they think I can do it again. Not a square inch of floor space, and now I'm told to find room for a test bench . . ." We stopped him before he exploded. Gently we told him his worries were at an end. We were from Yale. We'd been called in by the management to plan a new scheme for materials handling.

"Materials handling? . . . that's what I told them six months ago! Clear at least three aisles and we could stack to the end bay northlight . . . Well, well.

Here, let me show you the annexe . . ."

He moved like a different man. He had ideas. We had ideas. Together we plotted a scheme that gave him just what he wanted. And, not surprisingly, we pleased the management too—when they saw the turn their costs would take.

IS LACK OF SPACE RESTRICTING YOUR OUTPUT?

Yale's versatile

"WORKSAVER"

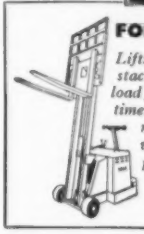
is specially suitable for smaller plants

AMONG the wide range of Yale handling equipment the "Worksaver" series of electric trucks is of special interest to factories where restricted space or low-load floors have previously made mechanical handling impractical. Its small size, light weight and extreme ruggedness give big-truck advantages with small-truck economy and convenience.

It will lift, move and stack raw materials or finished products. It saves time, space and manpower. You can ride it or walk it. And it will start cutting costs from the minute you put it to work.

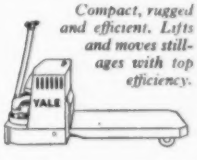
The "Worksaver" is available in five basic types : pallet, low-lift platform, high-lift platform, fork-lift and tractor.

PALLET *Built to stand up to rugged jobs. Lifts and moves maximum load pallets with ease and accuracy.*



FORK LIFT

Lifts, moves and stacks over low-load floors: saves time, space and manpower wherever it's put to work.



PLATFORM

Compact, rugged and efficient. Lifts and moves stillages with top efficiency.

TRACTOR

A powerful and manœuvrable tractor unit to pull trailers or trailer trains with up to 700 lbs. drawbar pull.

YOU GET ALL THESE ADVANTAGES WITH THE "WORKSAVER"

- *Manœuvrable in small spaces and narrow aisles.*
- *Light weight with great strength and power permit heavy duty work on low-load floors.*
- *Dead man control cuts power and applies brakes automatically in emergency.*
- *Simple fingertip controls—unskilled staff can move, lift and stack with speed and safety.*
- *Low initial cost, low running cost, economical maintenance, long life.*

MATERIALS HANDLING EQUIPMENT

MADE IN ENGLAND BY

YALE

REGISTERED TRADE MARK

THE YALE & TOWNE MANUFACTURING COMPANY, MATERIALS HANDLING DIVISION, DEPT. AC.4, WEDNESFIELD, STAFFS. PHONE: WILLENHALL 630

Index to ADVERTISERS

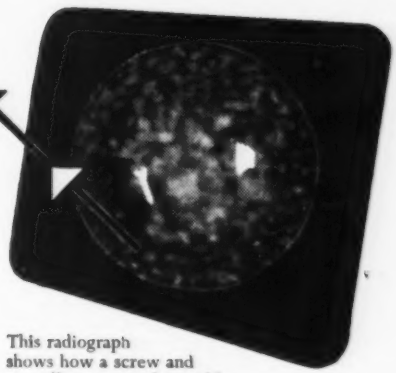
	Page
Abix (Metal Industries), Ltd.	cv
Advance Linen Services Ltd.	lix
Advita, Ltd.	lxxxi
Aerox, Ltd.	Mar.
Agricultural & Chemical Products, Ltd.	cxiv
Air Control Installations, Ltd.	xi
Airguard, Ltd.	Feb.
Albro Fillers & Engg. Co., Ltd.	lxxxvi
Alfa-Laval Co., Ltd.	xiii
Alite Machines, Ltd.	xcviii
Allen, Stafford, & Sons, Ltd.	Mar.
Allspeeds, Ltd.	xliii
Anderson, C. F., & Son, Ltd.	Dec.
Angel Warehouse Co., Ltd.	cxiv
Anglo-American Plastics, Ltd.	Dec.
Anglo-American Vulcanized Fibre Co., Ltd.	Dec.
Anglo-Italian Preserves, Ltd.	cx
Anhydro, A/S	c
A.P.V. Co., Ltd.	xxvii
Argentine Government	Sept.
Associated Metal Works, Ltd.	c
Autopack, Ltd.	Sept.
Barron, W. S., & Son, Ltd.	cii
Bayer Products, Ltd.	ci
Bear Honey Co., Ltd.	cviii
Beddington Nut & Produce Co., Ltd.	cxii
Begg, Cousland & Co. Ltd.	cvi
Bellingham & Stanley, Ltd.	cx
Benjamin Electric, Ltd.	lxi
Bennet, Sons & Shears, Ltd.	Mar.
Benninga (Mitcham), Ltd.	Sept.
Benton & Stone, Ltd.	Mar.
Bertrams, Ltd.	Mar.
Betts & Co., Ltd.	lxvii
Birmingham Chemical Co., Ltd.	xlvii
Blakeborough, J., & Sons, Ltd.	Dec.
Blaw Knox, Ltd.	xlv
Bliss, E. W., (England), Ltd.	xxxix
Boehm, Fredk., Ltd.	lxxxvi
Bos, F., Ltd.	cviii
Bowaters Sales Co., Ltd.	Jan.
Bowser, Monks & Whitehouse, Ltd.	Mar.
Braby, Fredk., & Co., Ltd.	Mar.
Bramigk & Co., Ltd.	xxxiii
Bramwell, S., & Co., Ltd.	lxxxiv
Brewers' Foods Supply Co. Ltd.	Mar.
Brierley, Wm., Collier & Hartley, Ltd.	lxxxiv
British Belting & Asbestos, Ltd.	Mar.
British Cellophane, Ltd.	xxii
British Electrical Development Association	xxviii
British Hydrological Corporation	Mar.
B.I.P. Chemicals, Ltd.	Mar.
British Industries Fair	Oct.
British Jeffrey-Diamond, Ltd.	Mar.
British Rayophane, Ltd.	lxxxii
British Thomson-Houston Co. (Rugby)	Feb.
British Visqueen, Ltd.	xii
British Wedge Wire Co., Ltd.	Mar.
Broadbent, Thomas, & Sons, Ltd.	Mar.
Brockhouse Heater Co., Ltd.	Nov.
Brook Motors, Ltd.	Mar.
Brown & Forth, Ltd.	Mar.
Brown & Polson, Ltd.	lxix
Bryan, Wm., Ltd.	lxxxii
Building Trade Supplies	Oct.
Bulmer, H. P., & Co., Ltd.	Mar.
Bush, W. J., & Co., Ltd.	xc, Cover iii
Butterfield, W. P., Ltd.	lxxiii
Caleb Duckworth, Ltd.	Mar.
Calfos, Ltd.	Mar.
Cambitzi, G., & Co., Ltd.	Mar.
Cambridge Instrument Co., Ltd.	lxxx
Canning Town Glass Works, Ltd.	xc
Caribbean Commercial Agency	Oct.
Cashmore, John, Ltd.	Mar.
Cellulose Development Corpn., Ltd.	xciii
Chamberlain & Willows	cxii
Chelsea Flour Mills, Ltd.	Sept.
Cinema-Television, Ltd.	xxxii
Clarke-Built, Ltd.	Mar.
Clark, George, & Co., Ltd.	Cover i
Clark, T. & C., & Co., Ltd.	cxi
Clemens & Vogl	cvi
Coates Bros. Inks, Ltd.	Mar.
Cohen, George, Sons & Co., Ltd.	cxv
Colt Ventilation, Ltd.	lxxvii
Commer Cars, Ltd.	xvi
Confectioners' Vegetable Colours & Fruit Essences Co., Ltd.	cviii
Constantin (Engineers), Ltd.	Jan.
Coombs, H. A., Ltd.	cvi
Cooper, McDougall & Robertson, Ltd.	Sept.
Corn Products Co. Ltd.	lxix
Craigmillar & British Creameries, Ltd.	xlix
Creamery Package Mnfg. Co., Ltd.	Feb.
Crofts (Engineers), Ltd.	xxxiv
Crompton Parkinson, Ltd.	xxxvi
Cumming, Parsons, Ltd.	Nov.
Cuxson Gerrard & Co., Ltd.	xcviii
Dale, John, Ltd.	Mar.
Danks, Edwin, & Co., Ltd.	lxiii
Davey, Paxman, & Co., Ltd.	xcii
Davis, H., & Co., Ltd.	Dec.
Dawson Bros., Ltd.	Mar.
Demby, Hamilton & Co., Ltd.	Feb.
Denton Edwards Paints, Ltd.	lxxxv
D.M.P. Sales, Ltd.	Mar.
Downton, John, (Electric), Ltd.	cxii
Drakesons	cxiv
Drayton Regulator & Instrument Co.	li
Duche, T. M., & Sons, Ltd.	xcii
Electropower Gears, Ltd.	cvii
Electrothermal Engg. Co., Ltd.	cii
Electrolux, Ltd.	Mar.
English Electric Co., Ltd.	x, lxv
English Grains Co., Ltd.	Nov.
Evan Cook's Packers, Ltd.	cxi
Evans, Wm., & Co., Ltd.	liii
Everitt & Co., Ltd.	xcvi
Fatoils, Ltd.	cxii
Feaver, John, Ltd.	ix
Felber, Jucker, & Co., Ltd.	lxxxii
Fell & Briant, Ltd.	Oct.
Fenner, J. H., & Co., Ltd.	xxxviii, cii
Filling Machines, Ltd.	July
Finch & Knight, Ltd.	cxii
Fisher & Ludlow, Ltd.	Sept.
Fisher's Foils, Ltd.	lv
Fison, Edward, Ltd.	Mar.
Flexible Packaging, Ltd.	lxiv
Flexo Plywood Industries, Ltd.	cxvi
F.M.S. (Farm Products), Ltd.	Dec.
Food Machines (Slough), Ltd.	July
Foster Instrument Co., Ltd.	lxxix
Fox, Samuel, & Co., Ltd.	Cover ii
Fraser, J., & Son, Ltd.	Mar.
Frischmann, H.	Nov.
Fuller Horsey, Sons & Cassell	cx
Gardner, Wm., & Sons, (Glos.), Ltd.	xlviii
Garrould, E. & R., Ltd.	Feb.
Garvin, L., & Co., Ltd.	cviii
Gas Council	Mar.
G.C. Engineering Co., Ltd.	xviii
Gee Manufacturing Co., Ltd.	xlvi
General Electric Co., Ltd.	Mar.
Gerbig G.m.b.H., Wilhelm	Mar.
Girdlestone Pumps, Ltd.	Nov.
Giusti, T., & Son, Ltd.	cix
Glentham Essence Co., Ltd.	Nov.
Gloy & Empire Adhesives, Ltd.	Mar.
Goring Kerr, Ltd.	Jan.
Gosheron, John, & Co., Ltd.	cv
Graham & Co., Ltd.	cxvi
Grew, James & Co., Ltd.	Mar.
Gunson, R. W., (Seeds), Ltd.	Mar.
Haller & Phillips, Ltd.	xcix
Hamburger, M., & Sons	cvi
Hanover Fair	Mar.
Hanovia, Ltd.	lxxxvii
Hansella Machinery & Packaging, Ltd.	xxxiii
Hardaker, John T., Ltd.	xcvii
Harradine, J., & Sons, Ltd.	xix
Harvey, G. A., Ltd.	lxxxiii
Havinden, G., Ltd.	Cover i
Hawker & Co.	cx
Heston Equipment Co., Ltd.	xli
Hogg, Thos.	cxiv
Holden & Brooke, Ltd.	Sept.
Honeywell-Brown, Ltd.	Mar.
Hopkin & Williams, Ltd.	lxxxv
Hopkinsons, Ltd.	Mar.
Horton Mnfg. Co., Ltd.	Dec.
Howard Pneumatic Engg. Co., Ltd.	lxxii
Howards (Colney), Ltd.	Nov.
Hull Development Committee	Mar.
Hunt, John, (Bolton), Ltd.	i
Hunt Partners, Ltd.	xv
Imperial Chemical Industries, Ltd.	xii, xx, xlii
Incandescent Heat Co., Ltd.	Oct.
Incinerator Co., Ltd.	xcviii
Industrial Products (Speco), Ltd.	Mar.
J. & R. (Butchers) Supplies, Ltd.	c
Jackson Henry (Liverpool), Ltd.	Mar.
Jenkins, Robert, & Co., Ltd.	Mar.
Jenner, A. & C., Ltd.	Mar.
Job Day & Sons, Ltd.	Feb.
Johnson, A., & Co. (London), Ltd.	xci
Johnson & Johnson (Great Britain), Ltd.	Dec.
Jones Cranes	Nov.
Jones, Samuel, & Co., Ltd.	lx
Kane, Frederick C.	Feb.
Kek, Ltd.	ciii
Kellie, R., & Son, Ltd.	xxix
Kemball, Bishop & Co. Ltd.,	Mar.
Kemp, Frank, Ltd.	cix
Kestner Evaporator & Engg. Co. Ltd.,	Mar.
Kidde, Walter, Co., Ltd.	Dec.
Kimpton Bros., Ltd.	Mar.
Kleenkut Bindings Co., Ltd.	cx
Kustner Bros., Ltd.	cvii
Lacy-Hulbert & Co., Ltd.	Dec.
Lambert, L., & Co., Ltd.	Mar.
Lautier Fils, Ltd.	Nov.
Leiner, P., & Sons, Ltd.	xxiii
Lidano, A/S	cviii
Loders & Nucoline, Ltd.	lxxviii
Loma Electronic Equipment, Ltd.	Mar.
Longwood Engg. Co., Ltd.	Mar.
Machinery (Continental), Ltd.	Aug.
Magnetic Valve Co., Ltd.	Mar.
Maitlands (Metal Works), Ltd.	c
Marshall, A. L. (Carlton), Ltd.	Jan.
Mather & Platt, Ltd.	lxxi
May & Baker, Ltd.	Feb.
Mayer, Newman & Co., Ltd.	Mar.
Measurement, Ltd.	lxxiv
Medway Corrugated Paper Co., Ltd.	xxiv
Metafiltration Co., Ltd.	Mar.
Metal Box Co., Ltd.	xxi
Metal Closures, Ltd.	Mar.
Metal Propellers, Ltd.	Dec.
Midland Dairy M.Cs., Ltd.	Oct.
Mill Cleaning Services, Ltd.	vi
Mitchell Engineering, Ltd.	xxvi
Mono Pumps, Ltd.	Mar.
Monsanto Chemicals, Ltd.	Mar.
Morris, Herbert, Ltd.	xci
Morton, Robert, & Co., Ltd.	Jan.
Myers & Foulkes	cxiv
National Adhesives, Ltd.	Mar.
National Glass Works (York), Ltd.	xcviii
National Industrial Fuel Efficiency Service	lxxxviii
Negretti & Zambra, Ltd.	Mar.
Newalls Insulation Co., Ltd.	Aug.
Nipa Laboratories, Ltd.	Mar.
Norman Engg. Co.	xcv
Northern Ireland Distributors, Ltd.	July
Norwood, W., & Sons, Ltd.	xcvi
Nu-Swift, Ltd.	Feb.
Opancol, Ltd.	lxxxvii
Oppenheimer Casing Co. (U.K.), Ltd.	lvii
Optrex, Ltd.	July
Ormerod Engineers, Ltd.	c
Osborne Engineers, Ltd.	lxxxiii
Packaging Exhibition	Jan.
Padley & Venables, Ltd.	Mar.
P.A.M., Ltd.	cxvi
Pascall Engineering Co., Ltd.	Mar.
Passburg-Block-Haas, G.m.b.H.	Mar.
Payne, P. P., & Son, Ltd.	xxxvii

If things are there that shouldn't be . . .

YOU RISK YOUR REPUTATION!

Photo by courtesy of Brand & Co. Ltd.

One offending article in a million . . . containing perhaps a pin, nail, stone, china or even glass . . . can ruin your reputation.
Better play safe . . . consult Philips. Ask how inspection by X-ray can protect *your* goodwill. Modern apparatus, incorporated in the production line itself, enables an unskilled operator to detect, by visual examination, *every* pack before it leaves the factory.



This radiograph shows how a screw and a small stone are detectable in a Christmas pudding.

Send or 'phone for full information to-day

PHILIPS

PHILIPS ELECTRICAL LTD

X-RAY DIVISION

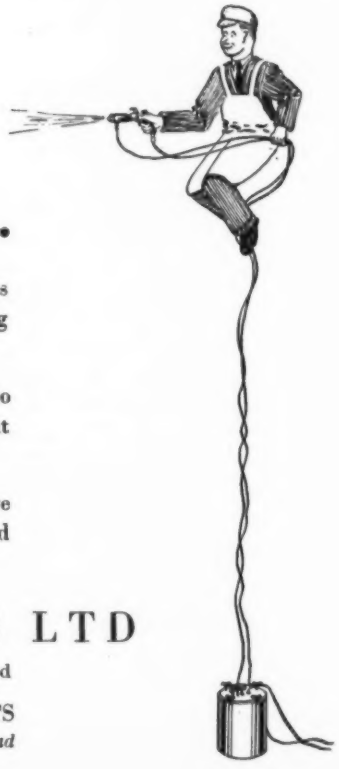
CENTURY HOUSE • SHAFTESBURY AVENUE • LONDON • WC2 • GERrard 7777
(PXI.0092)

Index to ADVERTISERS

	Page
Peerless & Ericsson, Ltd.	Nov.
Permoglaze, Ltd.	Mar.
Permutit Co., Ltd.	xxx
Peters, G. D., Ltd.	Dec.
Philips Electrical, Ltd.	v
Pilkington Bros., Ltd.	Feb.
Plenty & Son, Ltd.	xcvi
Polak & Schwarz, Ltd.	Feb.
Pollard Bearings, Ltd.	lviii
Porteus, G., & Sons, Ltd.	ci
Potter, F. W., & Soar, Ltd.	cxii
Powell & Co.	Mar.
Powell Duffryn Carbon Products, Ltd.	Mar.
Power Jacks, Ltd.	Mar.
Premier Colloid Mills, Ltd.	Nov.
Premier Filterpress Co., Ltd.	civ
Princeps Chocolate Works	Sept.
Pulsometer Engg. Co. Ltd.	cxvi
Purdy Machinery Co., Ltd.	ciii
Pye, W. G., & Co., Ltd.	Jan.
Q.V.F., Ltd.	Sept.
Ransomes, Sims & Jefferies, Ltd.	Feb.
Rapid Magnetic Machines, Ltd.	Feb.
Rayner & Co., Ltd.	xxv
Reads, Ltd.	Nov.
Realm Engineering Works, Ltd.	Mar.
Redler Conveyors, Ltd.	Mar.
Reigate Warehouses	Oct.
Renold Chains, Ltd.	xvii
Reynolds & Grayer, Ltd.	civ
Roberts, David, & Son	Feb.
Rotoplunge Pump Co., Ltd.	Jan.
Rowe Bros., & Co., Ltd.	Nov.
Royles, Ltd.	Nov.
R.T.S.C. Home Sales Ltd.	Feb.
Rubber Improvement, Ltd.	xl
Russell Construction, Ltd.	Jan.

	Page
Samuelson, P., & Co., Ltd.	Mar.
Saunders Valve Co., Ltd.	Mar.
Sauven Perforating Machine Co.	civ
Saxon Engg. Co., Ltd.	Nov.
Scherer, R. P., Ltd.	Aug.
Sculthorp, R., & Co., Ltd.	July
Semtex, Ltd.	viii
Seyfried, John F., & Sons, Ltd.	Feb.
S.F.P. (Food Products), Ltd.	Mar.
Shell Chemicals, Ltd.	liv
Short & Mason, Ltd.	Feb.
Silber, L. I., & Co., Ltd.	Oct.
Silverson Machines (Sales), Ltd.	Feb.
Simon, Henry, Ltd.	lii, lxxxix
Skerman, C., & Co., Ltd.	cxv
SMALL ADVERTISEMENTS	cxiii-cxv
Small Electric Motors, Ltd.	Mar.
Soya Foods, Ltd.	xcvii
Spirax-Sarco, Ltd.	lxxvi
Spooner Food Machinery Engg. Co., Ltd.	xcv
Spring Grove Laundries, Ltd.	xc
Stacey, Frank, & Co., Ltd.	cx
Stanley Engg. Co.	Dec.
Star Welding Ltd.	June
Stelcon (Industrial Floors), Ltd.	Mar.
Stevenson & Howell, Ltd.	Mar.
Sturge, J. & E., Ltd.	lxxxix
Sturtevant Engineering Co., Ltd.	lvi
Swift & Swallow, Ltd.	xciv
Taylor Rustless Fittings Co., Ltd.	Mar.
Teleflex Products, Ltd.	Mar.
Telegraph Construction & Maintenance Co., Ltd.	lxii
Thames Board Mills, Ltd.	Mar.
Thomas Richard, & Baldwins, Ltd.	Cover iv
Thompson & Capper (Wholesale), Ltd.	lxvi
Thompson, John, (Dudley), Ltd.	Nov.
Thompson & Norris Mnfg. Co., Ltd.	Jan.

	Page
Transparent Paper Ltd.	vii
Trapow, D., & Co., Ltd.	xciii
Tunnel Glucose Refineries, Ltd.	Jan.
Union Food Machinery Co., Ltd.	Mar.
United Glass Bottle Mnfrs., Ltd.	xliv
United Indigo & Chemical Co., Ltd.	Mar.
U.K. Dried Fruit Co., Ltd., The	Nov.
United Steel Companies, Ltd.	Cover ii
Universal Metal Products, Ltd.	Oct.
Usines Vermylen, S.A.	cii
Valley Products (Lye), Ltd.	Aug.
Viskase, Ltd.	Jan.
WAECO, Ltd. (Fumite Division)	xcvi
Walker, Crosweller & Co., Ltd.	lxviii
Waller & Co., Ltd.	xcix
Warwick Production Co., Ltd.	xxxi
Washington Chemical Co., Ltd.	Mar.
Webster, Isaac, & Sons, Ltd.	Mar.
Weir, G. & J., Ltd.	lxxv
Wetter, J. C., & Co., Ltd.	Mar.
Whiffen & Sons, Ltd.	Feb.
White, Tomkins & Courage, Ltd.	lxx
Whittaker, Arthur	cxiii
Willcox, W. H., & Co., Ltd.	xxxv
Williams (Hounslow), Ltd.	Mar.
Wiseman, Alfred, & Co., Ltd.	civ
Yale & Towne, Ltd.	iii
York Shipley, Ltd.	Mar.
Yorkshire Engineering & Welding Co., Ltd.	Mar.
Youngman, W. C., Ltd.	xiv



We *are* rather clever...

. . . at applying paint, by hand or spray, in food factories and the like without interfering with production or bespoiling the product

We compete throughout the country. Why not write to us now? Surveys and quotations are free and without obligation.

For the past 8 years our mobile, well equipped teams have delighted our customers by their efficiency in cleaning and painting buildings or machinery.

MILL CLEANING SERVICES LTD

Subsidiary of The Murphy Chemical Company Limited

WHEATHAMPSTEAD · ST. ALBANS · HERTS

Telephone: Wheathampstead 2233. Grams: Alvesco, Wheathampstead

In Diophane your product is SAFE, SEEN and SELECT!

SAFE *because all DIOphane films are dust- and greaseproof, some are moisture-proof, some even waterproof; and because DIOphane is enormously strong for its weight and thickness. Made in a number of types, there is a DIOphane film just right for packaging your product.*

SELECT *because DIOphane's glitter and sparkle have a magic effect on people's impulse to buy; because its standard range of brilliant colours and vivid multicolour printing make it the finest material in the world for making the eye-catching pack.*

SEEN *because DIOphane cellulose film is 95% transparent—more so even than window glass which is normally about 90% transparent. Your customers can carefully examine your product yet it remains as fresh and clean as when it left your factory.*

Diophane means Buy Again

and because your sales increase DIOphane pays for itself!

TYPES OF DIOPHANE

CODE	TYPE OF FILM	PROPERTIES	SUITABLE FOR	SEALING METHOD
P.T.	Plain (non-moisture-proof) Transparent	Transparent, proof against dust, air, oil, grease and handling	General wrapping including cereals—rice, tapioca, macaroni, etc. and foodstuffs requiring permeable wrapping: soap, cosmetics, bottles toys, textiles and paperware	Gum or gummed label Cellulose tape Wire staple Metal strip
P.C	Plain (non-moisture-proof) Coloured	As above, but coloured		
M.T.	Moistureproof Transparent	All properties of P.T. film, but also impervious to moisture vapour	Products needing protection against moisture or loss of moisture including biscuits, confectionery, cakes pharmaceuticals, cigarettes, dried fruits and metal parts	Special gum or gummed label Cellulose tape Wire staple Metal strip
M.C.	Moistureproof coloured	As above, but coloured		
M.T.T.W	Moistureproof Transparent Twistwrap	As M.T. film, but with greater flexibility	Twist wrapping confectionery	Twistwrapping by machine
M.S.T.	Moistureproof Heatsealing Transparent	As M.T. film, but can be heatsealed	Same products as listed under M.T. film. Sometimes unsuitable for products which require to be wrapped when hot	Special gum or gummed label Cellulose tape Wire staple Metal strip Heatsealing
M.S.C.	Moistureproof Heatsealing Coloured	As above, but coloured		
M.S.A.T.	Moistureproof Heatsealing Anchored Transparent (waterproof)	Transparent, waterproof and heatsealing, the waterproof coating being anchored to the base film	Syrupy and sticky products such as dates and table jellies and those likely to be in contact with water such as quick-frozen products	
L.S.A.T.	Lacquered Sealing Anchored Transparent	Transparent and heatsealing. Coated on both sides with a lacquer (semi-permeable to moisture vapour) anchored to the base film	Cakes, sausages, bacon, green vegetables, fresh fruits, and any products that require to breathe	

SPECIAL TYPES OF DIOPHANE CAN ALSO BE MADE FOR SPECIFIC REQUIREMENTS

SEND US YOUR ENQUIRIES; ASK FOR MORE DETAILS; WRITE OR PHONE TODAY.

T.P.L

Agents throughout the world

TRANSPARENT PAPER LIMITED

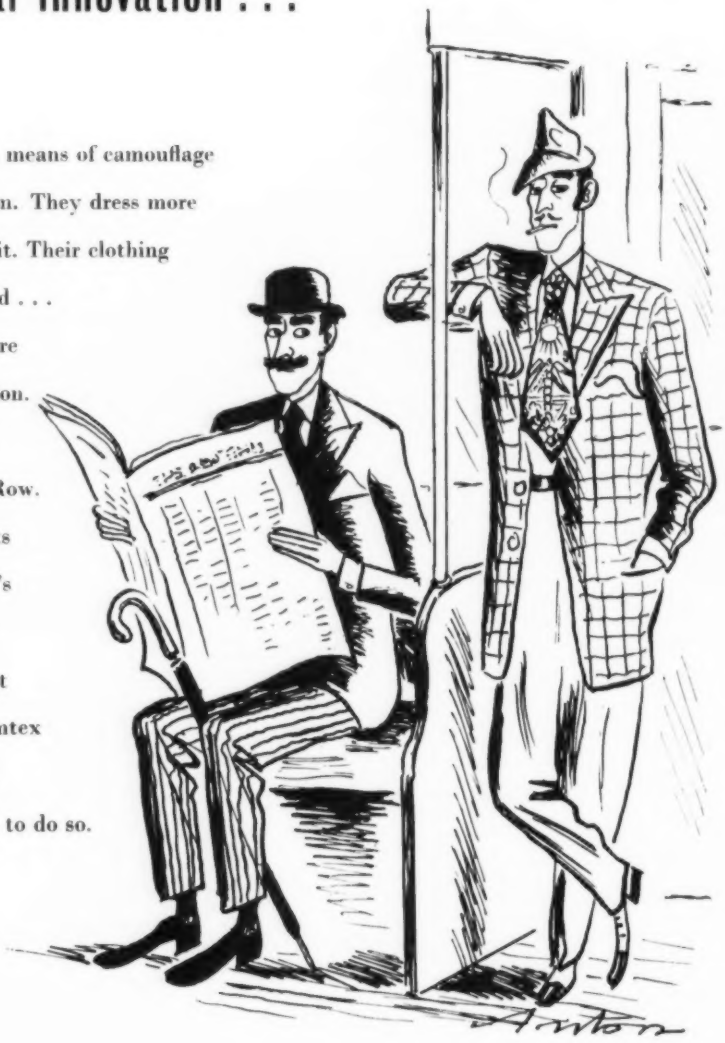
HALIFAX HOUSE, 51/55 STRAND LONDON, W.C.2

Telephone: Trafalgar 4311 *Telegrams: Transpaper Rand, London*

Cables: Transpaper, London

Resistance to Sartorial Innovation . . .

Englishmen look upon dress as a means of camouflage rather than as a medium of expression. They dress more to merge into the smog than to illuminate it. Their clothing is designed to protect rather than to gild . . . they resist innovation. Engineers are more open-minded. They would rather resist corrosion. Consequently, they look, for complete protection, more to Semtex than to Savile Row. The Semtex Industrial Division tailors its corrosion-resistant treatments to each firm's own measure. Many Works Managers have stopped corrosion making their plant look down-at-heel by writing to Semtex for technical advice and the illustrated brochure. Others are cordially invited to do so.



SEMTEX

INDUSTRIAL DIVISION

Headquarters and Southern Area Office: **Semtex Ltd. Semtex House, London, NW9 Tel: Hendon 6543**
Northern Area Office: **50 Blackfriars Road, Salford, 3 Tel: Deansgate 2128**

SPECIALISTS in INDUSTRIAL ANTI-CORROSION TREATMENTS · FLOORING & DECKING CONTRACTORS

A Dunlop Company

S.SE.3.

MADE TO MEASURE

Manufacturers of taper-topped cans available with a wide range of neck fittings.

The container illustrated is used for packing metallic powders and their mediums.

JOHN FEAVER

CONTAINERS MADE TO YOUR REQUIREMENTS

JOHN FEAVER LTD., 120 TOWER BRIDGE ROAD, LONDON, S.E.1

Telephone: BERMONDSEY 1753. Telegrams: TINPLATE, SOUPHONE, LONDON

Smaller–and more efficient

The new **'LE'** *range of ventilated motors*

- ½ h.p. to 25 h.p. in four frame diameters.
- Fully protected.
- Designed to new 1954/1955 NEMA dimensions.
- Available from stock.
- Publication DM.213 available on request.

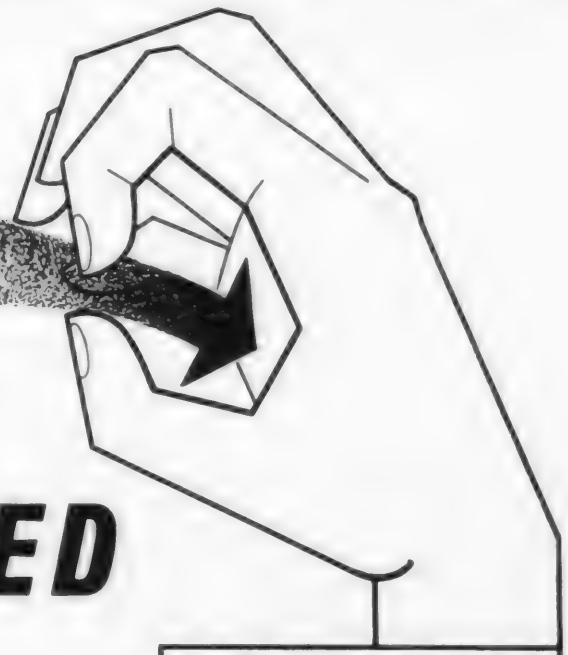
'ENGLISH ELECTRIC'

THE ENGLISH ELECTRIC COMPANY LIMITED, QUEENS HOUSE, KINGSWAY, LONDON, W.C.2
Industrial Motor Works, Bradford

WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

DM.39C5

dust



CONTROLLED

positively, permanently, by ROTOCLONE

Leading firms in the Food Industry have installed Rotoclone dust control equipment—and have immediately reaped big dividends through improved working conditions.

There are Rotoclones for controlling every type of dust and fume in every type of factory, large or small. Each Rotoclone is a self-contained system needing only connecting ducts and power to set it into operation . . . positively, permanently.

Outstanding Features

- Wet or dry collection
- Simple design
- Simple disposal of collected dust
- Easy maintenance

Why not write TODAY for fuller information?

Cut-away of Type N Rotoclone showing how dust is collected by the distinctive water curtain.

PATENT NO. 646147

Air Control Installations Ltd

RUISLIP
MIDDLESEX
Ruislip 4066
(8 lines)

Birmingham
Manchester
Newcastle-on-Tyne
Glasgow

ROTOCLONE—

The plant that makes your works "NOT SO DUSTY"

The secret of freshness is in the

Why are these patented 'Alkaflex' bags, as made by E. S. & A. Robinson Limited, Bristol, lined with 'Visqueen' polythene film?

Because..... *'Visqueen' keeps moisture in and unwanted moisture out.*

Because..... *Simple closure by heat sealing gives the product lasting protection ensuring factory-freshness upon opening.*

Because..... *'Visqueen' enables 'Alkaflex' bags to be used equally well for frozen foods or for products stored at normal temperatures.*

For the same reasons manufacturers of a multitude of products are making increasing use of 'Visqueen' film for liners for paper bags, cartons, drums—in fact, packages of every description.

Let us give you further information about how to protect YOUR product.

VISQUEEN

PROTECTS AND PRESERVES

VisQueen **POLYTHENE FILM**

We would like to know the name and address of our nearest 'Visqueen' Converter.

NAME .....

ADDRESS .....

.....

PRODUCT .....

Post to the address below

— a product of British Visqueen Limited, Six Hills Way, Stevenage, Herts. ***Phone: Stevenage 900*** BV.32

If you handle liquids & solids your factory needs **DE LAVAL**

PROCESS EQUIPMENT

To illustrate the wide application of De Laval Processes and Process Equipment we give below a selection of our latest Catalogues and Technical Bulletins. Copies will be sent with pleasure—please let us know your interests.

DE LAVAL PROCESSES

20752	De Laval Short Mix Process for Vegetable Oil Refining
BE2337	De Laval Continuous Margarine Process
5302E	De Laval Centriflow Fish Liver Oil Process
5305E	De Laval Potato Starch Process
5403E	De Laval Maize Starch Process
5401E	Fish Oil and Meal Production
5406E	Fish Reduction Plants

DE LAVAL CENTRIFUGES

20751	New Self Opening Centrifuge with automatic sludge discharge
20881	New Nozzle Separator capacities up to 10-15 tons/hour
20602	De Laval Animal fat purifiers
20911	De Laval Palm Oil Purifiers
19564	De Laval Hermetic Centrifuges
20125	De Laval Pressure discharge clarifiers
12687	De Laval Tar Dehydrators

DE LAVAL STRAINERS

20903
De Laval Rotosieves for the Starch Industry

19970
De Laval Vibrating Screens

N.1
De Laval Newcon Dual Strainers

DE LAVAL PUMPS

21187
De Laval Self-Priming Easy Clean Pump

21186
De Laval Easy-Clean Stainless Steel pumps

D23
De Laval Defoaming Pump

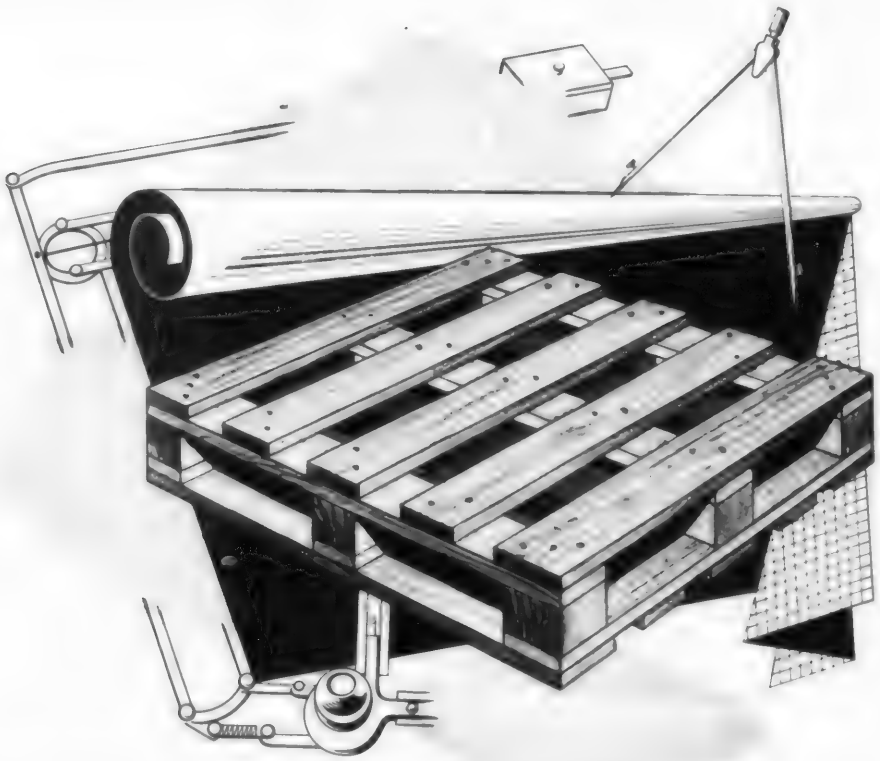
DE LAVAL HEAT EXCHANGERS

21427
General Heat Exchanger Catalogue

21217
Industrial Pattern Heat Exchanger

ALFA-LAVAL CO. LTD
GREAT WEST ROAD · BRENTFORD · MIDDLESEX

Smee's DL 328



Youngman PALLETS

designed to carry food

Kiln-dried African hardwood, air-dried Swedish softwood, fresh-sawn English hardwood . . . These are three of the timbers we use regularly in the construction of pallets and stillages. Which should be used, for the greatest efficiency coupled with wise economy, in pallets which will carry prepared food in cartons? Should the pallets be slatted or not? If so, what is the correct gap between the slats?

We know all about these problems—and many others. And we know the right answers because pallets and stillages are our business. We are one of the largest manufacturers in the country, and we specialise in the manufacture of types to meet special requirements.

For the latest news of pallets and stillages, and other Materials Handling equipment see our Industrial Equipment list. You can receive it regularly by writing to Sales Dept. FM/PS.

W. C. YOUNGMAN LIMITED

MATERIALS HANDLING DIVISION

MANOR ROYAL, CRAWLEY, SUSSEX. TELEPHONE: CRAWLEY 1234 (5 LINES)

MAKE SHORT WORK OF LONG RUNS

WITH

Velvetone (Regd.)

Messrs. Scribbans have been packing their delicious Swiss-Rolls for 25 years now—and Hunt Partners have kept up an unfailing supply of boxes for just that time too! Not the same design of course—new designs, new colours, new features have been introduced, all produced by our own 'VELVETONE' process, ideally suited for the long runs and the regular repeats required by this client.

Multiple colours can be used, and our machines are suitable for producing practically any size and shape of carton.

Small alterations or additions to a main design can be made during a long run, thus reducing stocks to be held to a minimum. Cartons are machine cut, and so can be machine packed at speed.

'VELVETONE' may well be the answer to one of your biggest problems. Why not contact Hunt Partners for further information?

HUNT PARTNERS LIMITED

Folding and Rigid Boxes Designed and Printed by Every Modern Method

Head Office: CLAPTON, LONDON, E.5
Phone: AMHerst 3388

Also at BRYNMENYN, S. WALES
Phone: Aberkenfig 367

The COMMER 1¼ ton
Forward Control ALL-STEEL VAN

50 B.H.P ENGINE WITH LONG LIFE POROUS CHROME BORES

FOUR-SPEED SYNCHROMESH GEARBOX

TELESCOPIC HYDRAULIC DAMPERS FRONT AND REAR

FLUSH FITTING SLIDING DOORS

ALL-STEEL CONSTRUCTION OVER 300 CU. FT. CAPACITY

for efficient LOCAL DELIVERY work

Here is a sturdy all-steel van with success written all over it—your success! With its smart appearance and businesslike finish it will carry your prestige proudly through the streets, whilst its sound practical design will give remarkably long life and low operating cost.

Send for a brochure TO-DAY

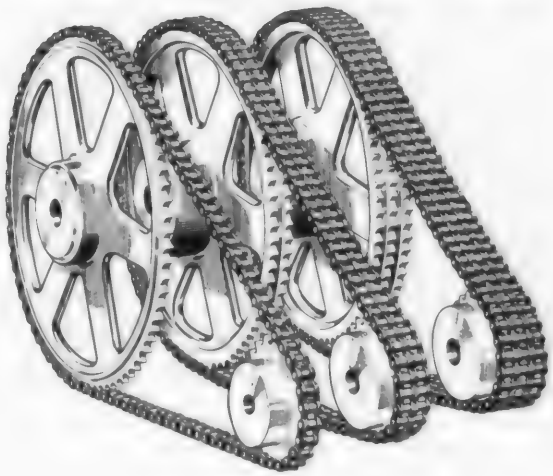
Smart and functional!

COMMER

A PRODUCT OF THE ROOTES GROUP

COMMER CARS LTD. LUTON BEDS. EXPORT DIVISION: ROOTES LTD. DEVONSHIRE HOUSE PICCADILLY LONDON W.1

By using RENOLD chain drives you save POWER



Renold chain drives, with an efficiency of 98·5%, transmit the power you pay for. For example, on a 20 h.p. drive the annual saving compared with an alternative form of drive can amount to 4,680 kWh; at £4.10.0 per 1,000 kWh = £21.0.0 per annum.

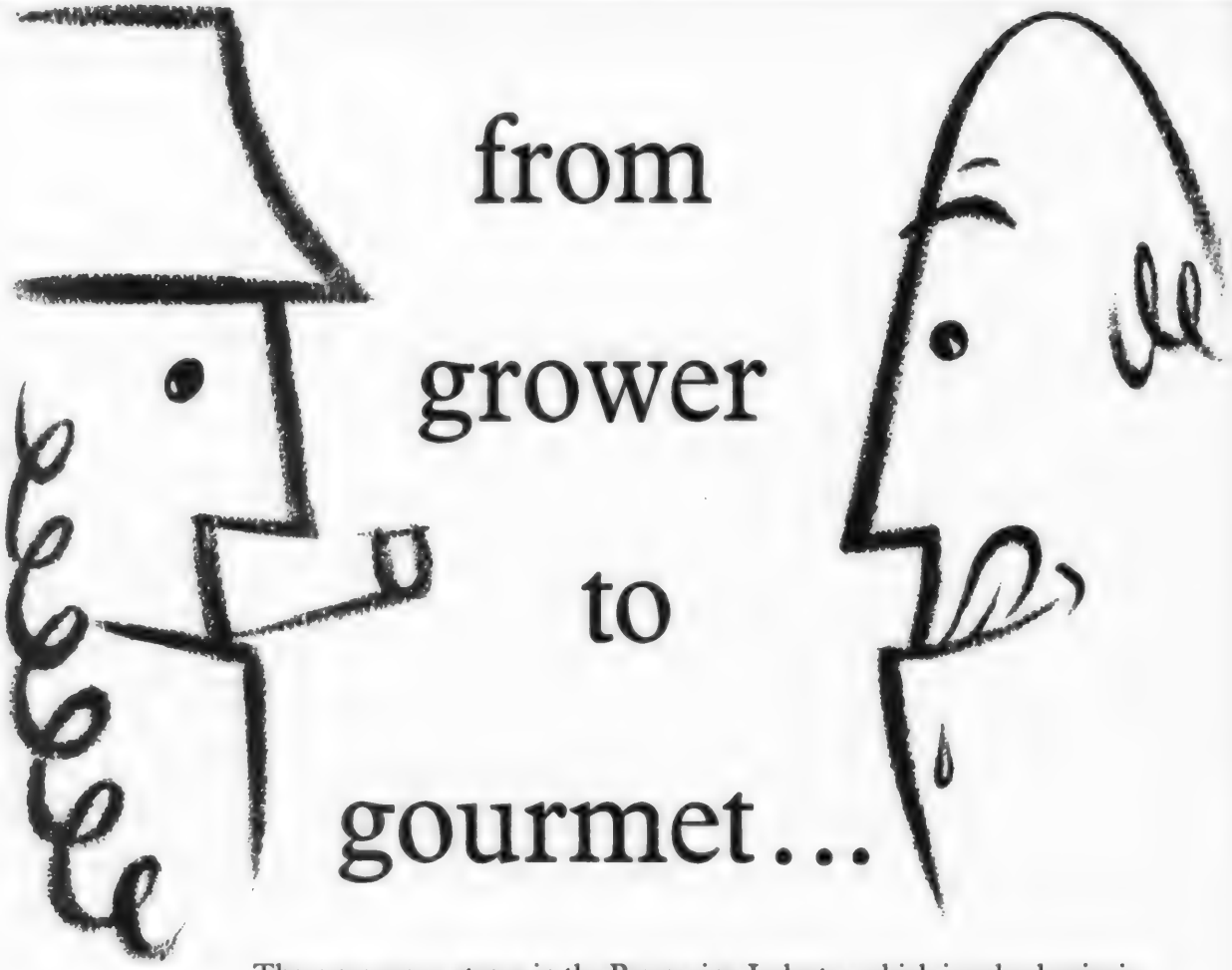
FOR FULL DETAILS OF **RENOLD** STANDARD **STOCK** SERIES CHAIN **DRIVES** WRITE FOR CATALOGUE Ref. 116/93/16A

No. 1 of a series of 4 advertisements

RC

RENOLD CHAINS LIMITED · MANCHESTER

Transmission and Conveying Chains, Wheels and Accessories for all mechanical purposes



from grower to gourmet...

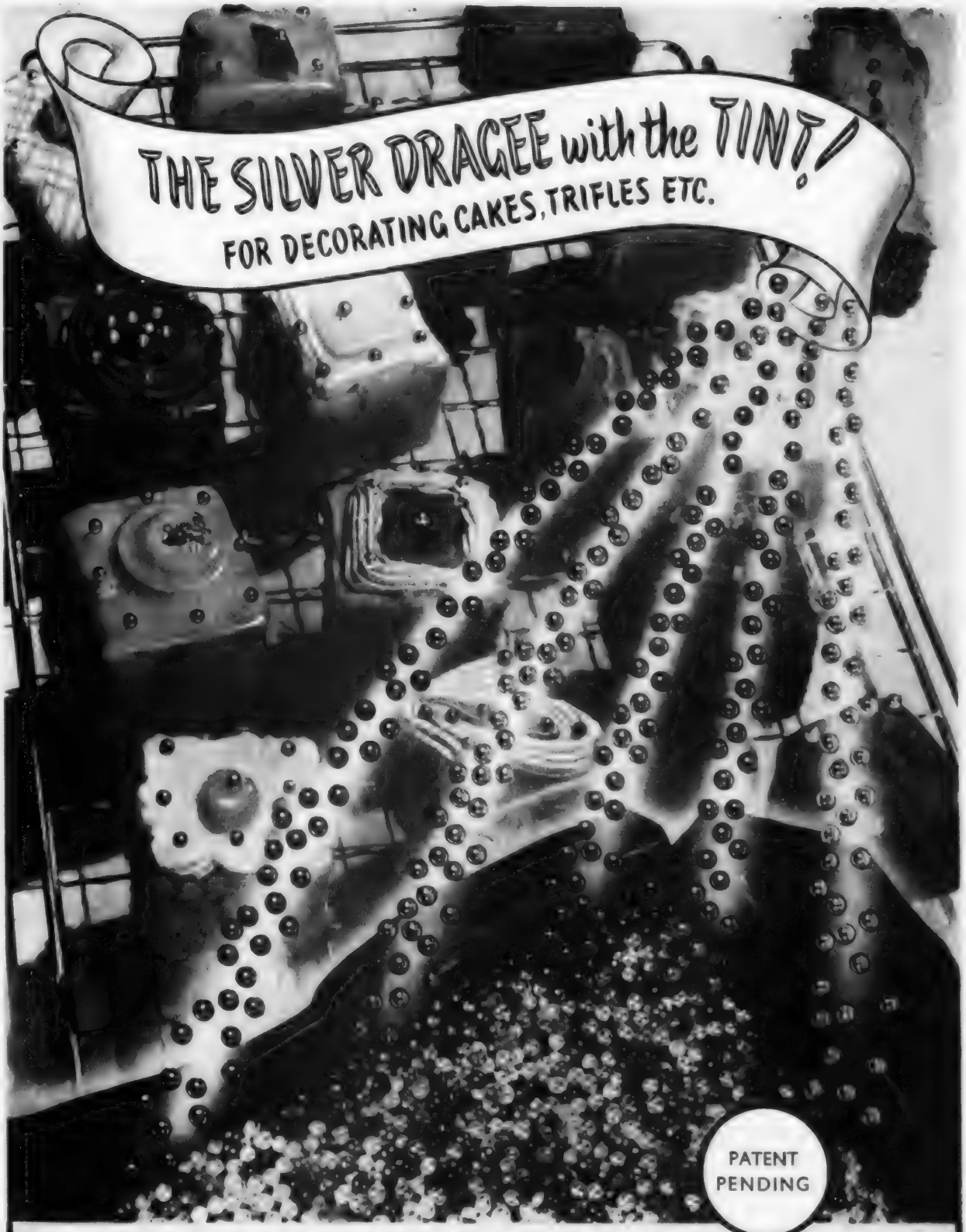
There are many stages in the Preserving Industry which involve hygienic handling. Braby aluminium trays are specially designed for this purpose; light to handle and stacked with safety, they are of one-piece seamless construction with rounded edges for rapid cleansing and sterilisation.

Braby non-corrosive aluminium trays are supplied with or without ventilating louvres in two sizes 20" × 15" × 6" deep, capacity 1,660 cubic inches and 18" × 13" × 5" deep, capacity 1,000 cubic inches.
Braby trays are also used for Meat, Fish, Confectionery and other foods.
We welcome your enquiries.

BRABY

FREDERICK BRABY & COMPANY LIMITED
ASHTON GATE WORKS, BRISTOL, 3 Tel: BRISTOL 64041
OTHER FACTORIES AT: London Works, Thames Road, **Crayford**, Kent. TEL: Bexleyheath 7777
Ida Works, Deptford, **London**, S.E.8. TEL: TIDeway 1234
Havelock Works, Aintree, **Liverpool**, 10. TEL: Aintree 1721
Eclipse Works, Petershill, **Glasgow**, N. TEL: Springburn 5151 Also **Falkirk**
OTHER OFFICES: 352-364 Euston Road, **London**, N.W.1 (Head Office) TEL: EUSton 3456
110 Cannon Street, **London**, E.C.4. (Export) TEL: MANsion House 6034
Queen's Buildings, 10 Royal Avenue, **Belfast**. TEL: 26509
Palace Street, **Plymouth**. TEL: 62261

266-123



J. HARRADINE & SONS LTD.

MANUFACTURERS OF EDIBLE CAKE DECORATIONS

294-306 ST. JAMES ROAD, LONDON, S.E.1

ESTABLISHED OVER 100 YEARS

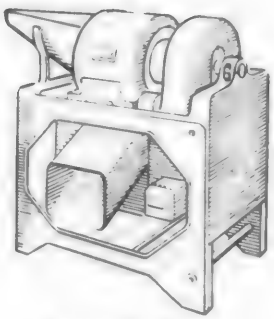
HOME AND OVERSEAS ENQUIRIES INVITED

TEL.: BERMONDSEY 4361/5

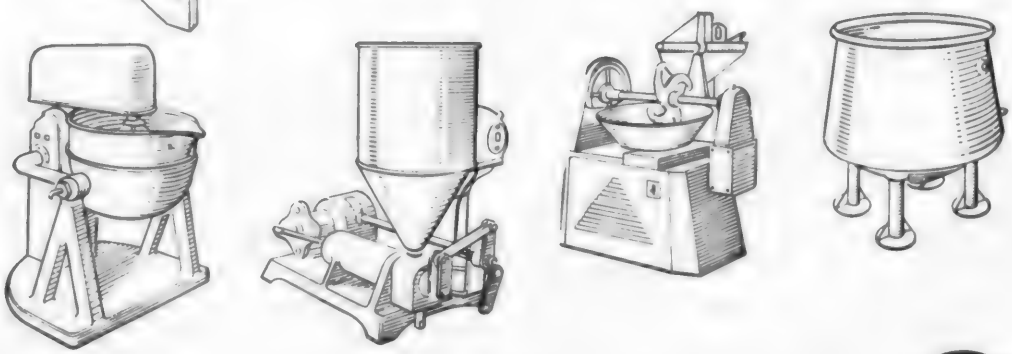
a little

LISSAPOL

(liquid cleanser)



goes a long way . . .



For further information please apply to :

IMPERIAL CHEMICAL INDUSTRIES LTD.,
LONDON, S.W.1

ICI

D.549

THE IDEAL KEY OPENING CAN

with the hermetic closure

and perfect "re-seal"

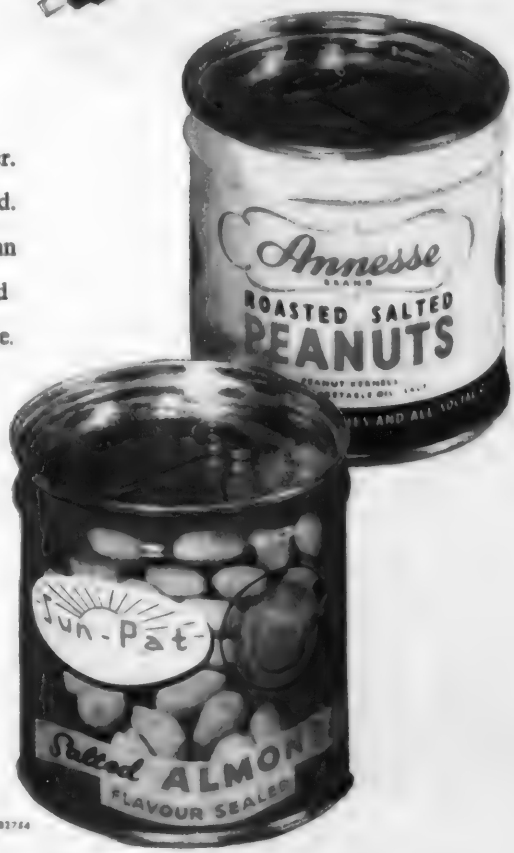
Hermetic Seal
Easy opening
Opening key supplied
Smooth "turned-over" edge
Hinged lid for re-seal
Colour printing direct on to metal

Ideal for NUTS · COCOA COFFEE · CUSTARD POWDER GLUCOSE · BABY & INVALID FOODS · MILK PRODUCTS CEREALS · CONFECTIONERY BISCUITS & CAKES COOKING FATS and many other products

Metal Box *'know-how'* does count!

The Collar Can has advantages for both manufacturer and consumer. It gives hermetic sealing. It is opened easily with the key provided. When opened the equivalent of a neat hinged-lid gives an efficient and convenient reseal. High quality surface decoration, printed direct on to the metal, can add sales and advertising value.

The Collar Can is precision made and designed for high speed filling and closing operations. It is ideally suited for most types of powders, solids and granulated products that need a hermetic seal to preserve freshness and flavour. An ingenious can proving that in container design and production Metal Box "Know-How" does count!



THE METAL BOX COMPANY LTD.

Metal Containers · Paper Products
Flexible Packages · Plastic Films and Laminates

THE LANGHAM · PORTLAND PLACE · LONDON W.1

MB2764

You wouldn't do this to your customer...

87% of the shopper's impressions are controlled by sight. You wouldn't expect her to buy blindfolded. Carry this further and you get the reason for today's ever-increasing demand for transparent cellulose film. Wrapped in "Cellophane" cellulose film, merchandise is protected, looks good, attracts attention, but above all, "Cellophane" lets the shopper see the goods and persuades her to buy.

Don't hide your product, show it in 'CELLOPHANE'...

"CELLOPHANE"—the first packaging film—and the greatest!

BRITISH CELLOPHANE LIMITED

Sales Offices: 12/13 CONDUIT STREET, LONDON, W.1

Reg. Offices and Factory: BATH ROAD, BRIDGWATER, SOMERSET

"Cellophane" is the registered trade mark of British Cellophane Ltd., and denotes the brand of cellulose film manufactured by them.

If you want to make the BEST -

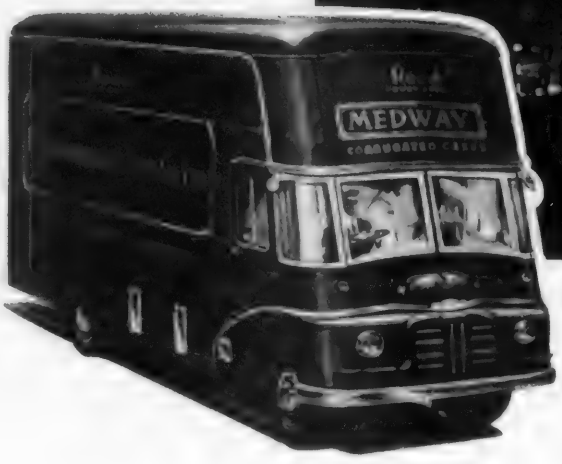
Use LEINER'S GELATINE

P. LEINER & SONS LTD.

Manufacturers of Gelatine for over a Century

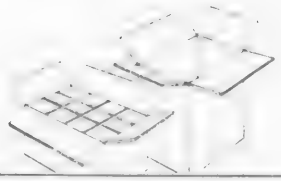
79 CREECHURCH LANE, LONDON, E.C.3. AVENUE 2276

A Tall Order!



Cleopatra's Needle, Embankment, London

This famous obelisk presented an outsize in transportation problems in 1878. In the world of commerce today packaging in Medway Corrugated Cases simplifies the safe transportation of many world-famous products.



MEDWAY

THE CASE FOR BETTER PACKAGING

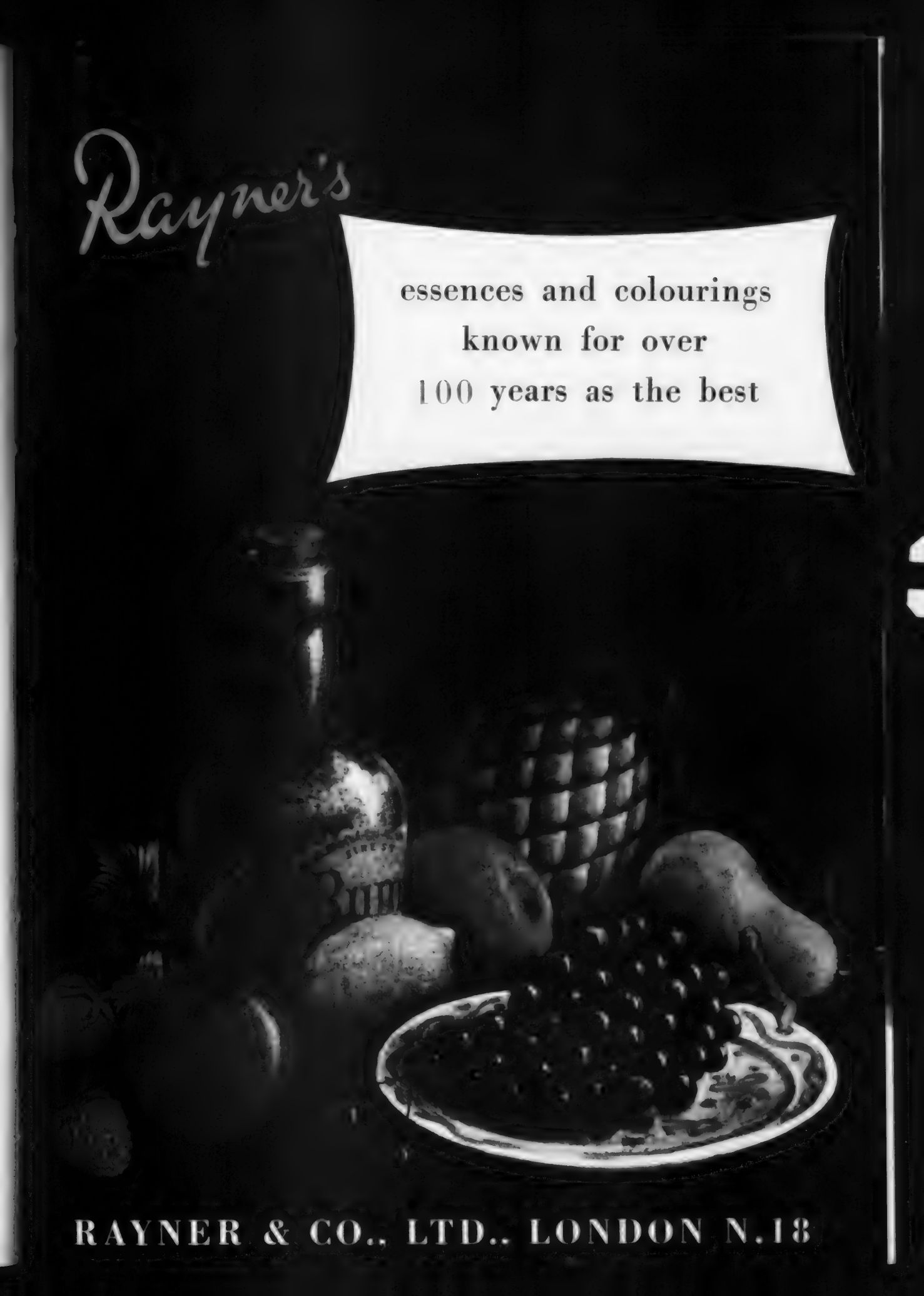
THE MEDWAY CORRUGATED PAPER CO. LTD., NEWHYTHE, MAIDSTONE, KENT

London Sales Office: Blackfriars House, New Bridge Street, London, E.C.4

DIVISION OF THE **Reed** PAPER GROUP

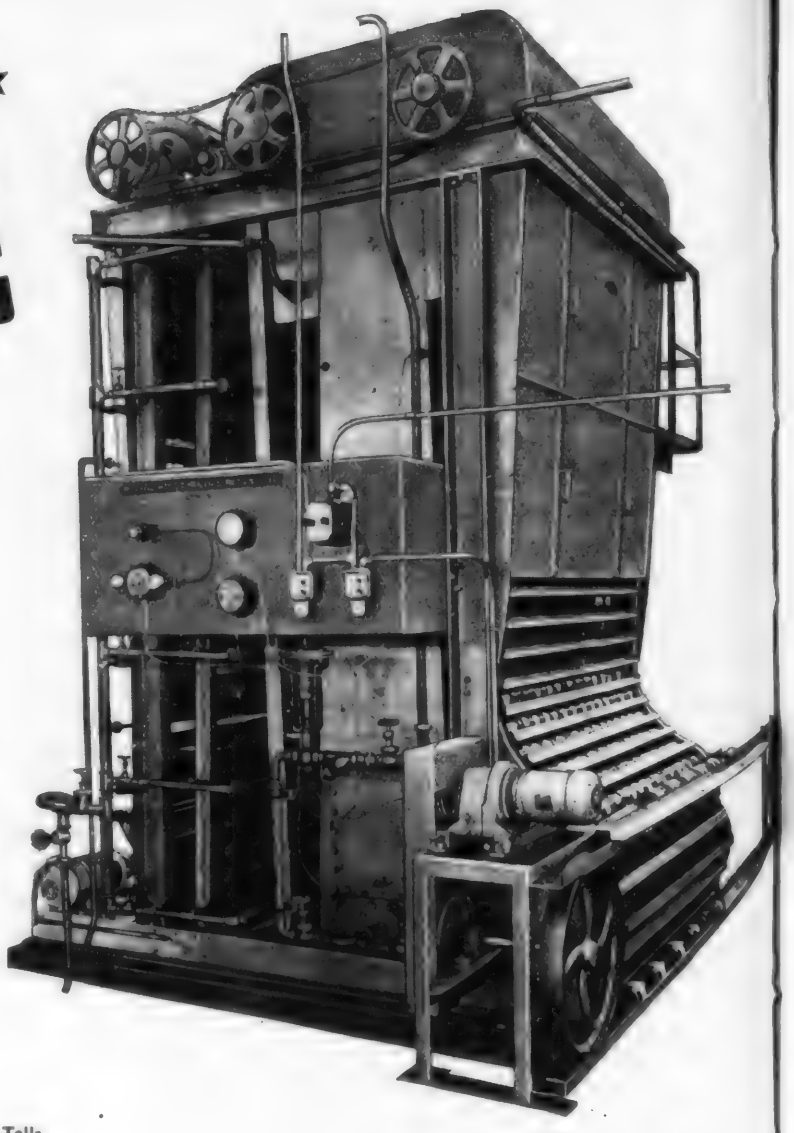
Rayner's

essences and colourings
known for over
100 years as the best



RAYNER & CO., LTD., LONDON N.18

A revolution* in CANNING



NEW

fruit processing technique produces BETTER quality packs and LARGER outputs

for
- **RASPBERRIES**
- **STRAWBERRIES**
- **LOGANBERRIES**
- **GOOSEBERRIES**
- **PLUMS**
- **CITRUS FRUITS**
- **PEACHES**
- **PEARS**
- **APRICOTS**
- **FRUIT SALADS, etc.**

OUTPUTS: From 65 – 260 CPM

STANDARD RANGE: A2½'s · A2's · No. 1 Talls
E1's · A1's

UNIVERSAL RANGE:
A2½'s · A2's · No. 1 Talls · A1's
E1's · ½ No. 1 Talls · 8 oz. · 5 oz.

THE OLD METHOD

FULLY AGITATING

*To produce a first quality pack, agitation should be at a **minimum** during the critical sterilising and cooling periods.*

★

THE NEW METHOD

INTERMITTENT AGITATION AT CERTAIN POINTS

Provides the BEST possible sterilising conditions for BETTER quality packs, and OPTIMUM performance with a LARGER output.

Mitchell-Webster

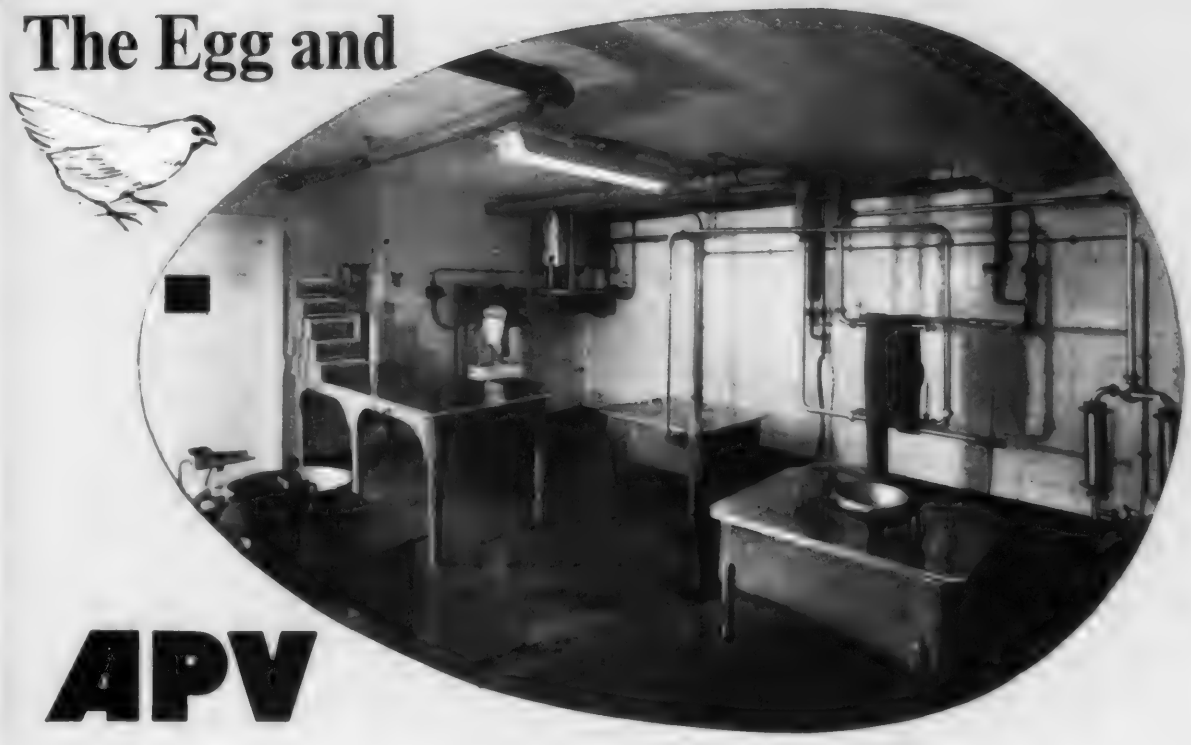
HYDROSTATIC Fruit Steriliser

MW1

For full details write to: **MITCHELL ENGINEERING LIMITED,** *Dept, G.,*
Food Machinery Division, **7 GOWER STREET, LONDON, W.C.1.**

R. W. WEBSTER & CO., LTD., ABBEY IRONWORKS, WALTHAM CROSS, HERTS.

The Egg and

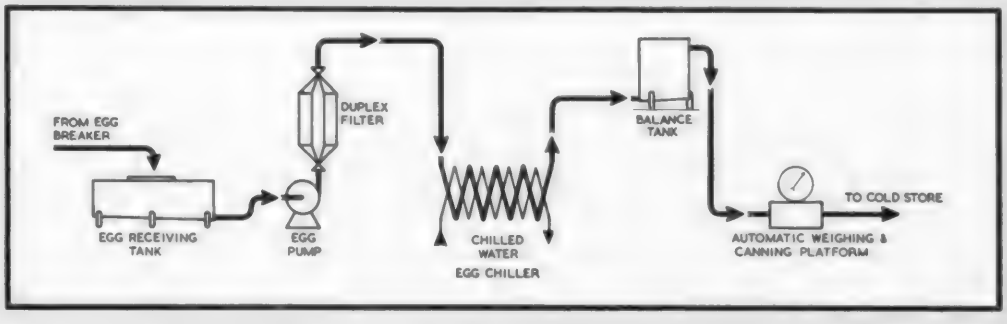


APV

APV have supplied several plants for the breaking, chilling and canning of liquid whole egg such as this one at the factory of the East Anglia Egg Co. The cans are kept in cold store in the frozen state until required for use in bakeries, etc. The egg retains its properties as a fresh egg after opening.

The APV Paraflow Chiller provides a great saving in refrigeration load in the Cold Store, by pre-chilling the egg from room temperature to say 36°F.

The APV Duplex Egg Filters remove particles of egg shell and the chalazæ from the egg, ensuring a smooth texture. The use of the APV Paraflow can be further extended to include pasteurisation of the egg where this is desired.

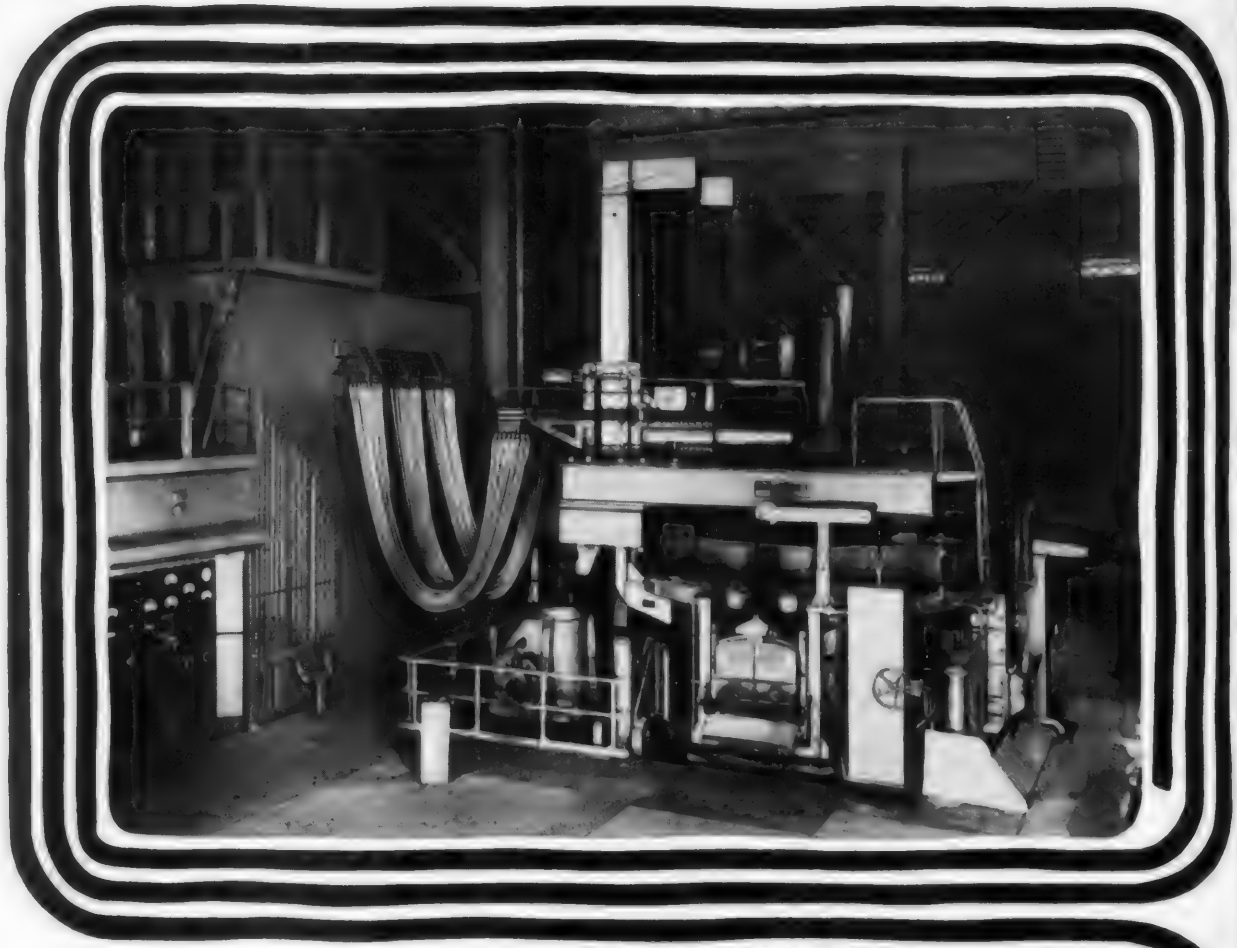


THE A.P.V. COMPANY LIMITED, WANDSWORTH PARK, LONDON, S.W.18

Telephone: Vandyke 4492 (11 lines)

Associated Manufacturing Companies in India, Australia and Ireland

F.B.2.



Having a hand in Productivity

In every industry or trade, electrical equipment is the key to modern production methods. There are probably more production-boosting and money-saving devices than you know of. Your Electricity Board can help you and give you sound advice.

They can also make available to you, on free loan, several films on the uses of electricity in Industry — produced by the Electrical Development Association.

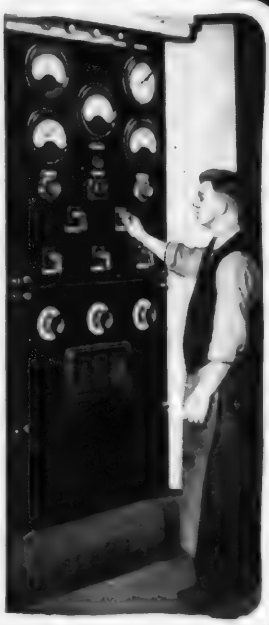
E.D.A. are publishing a series of books on "Electricity and Productivity". Four titles are available at the moment; they deal with Higher Production, Lighting, Materials Handling, and Resistance Heating. The books are 8/6 each (9/- post free) and the Electricity Boards (or E.D.A. themselves) can supply you.

The British Electrical Development Association,
2 Savoy Hill, London, W.C.2.

Steel - exactly!

The hand is on a lever, a small lever that is light to operate. But through that lever the hand is controlling the powerful current necessary to melt 20 tons of steel in an electric furnace. And because the furnace is electric the hand is doing much more than that. It is controlling the making of steel quickly, economically, exactly. Whether it be for production of exact-analysis steel or of cast iron from the lowest grade of scrap, there is nothing to beat the electric furnace. But the electric furnace is

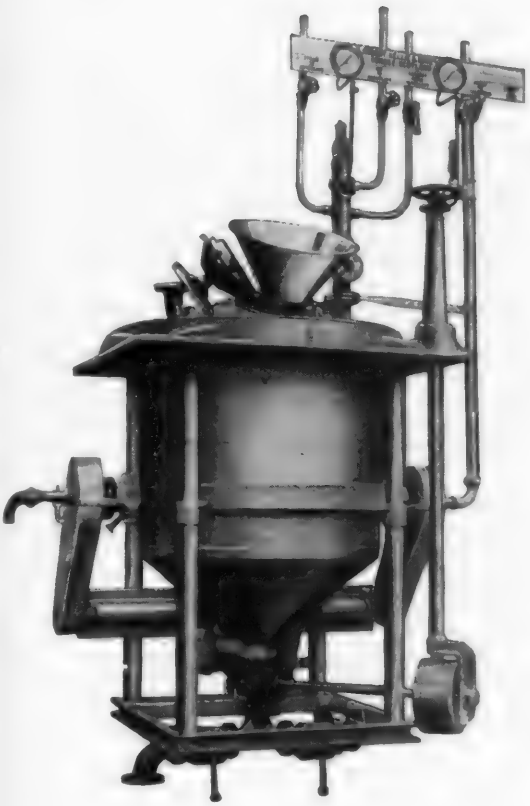
only one of the aids to higher Productivity that Electricity can bring you.



Electricity a Power of Good for PRODUCTIVITY

Kellie Announces

New all purpose Autoclave



FOR PROCESSING FRUIT PULPS, JAMS, JELLIES, JUICES WITH STEAM AND COMPRESSED AIR OR STEAM AND VACUUM ARRANGEMENTS

Patent No. 684357, other patents pending

No steam jacket is employed, there is no local overheating or skin burning of the product, no pitting or erosion.
NO METALLIC CONTENT IN THE FINISHED PRODUCT

Processing is by patent steam heated Revolving Calandria

The Calandria incorporates a Swash Plate Impeller

The rotating movement of the Calandria continually cleans the heating elements

The ratio of the rotating heating surface to volume is 50 per cent greater than that of a steam jacketed Autoclave resulting in greatly increased production

When operating as a batch fruit pulping unit added water content is controlled at a predetermined figure

Designed to supersede steam jacketed vessels of all types, this all purpose unit achieves results which from the point of view of economy, efficiency and quality of product cannot be equalled.

KELLIE

KELLIE for FOOD PLANT

Write today for further particulars to:

ROBERT KELLIE & SON LIMITED DUNDEE SCOTLAND

Telephone: Dundee 2819 (2 lines)

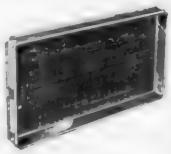
Telegraphic and Cable address: "Kellie" Dundee. Code A.B.C. (5th Edn).

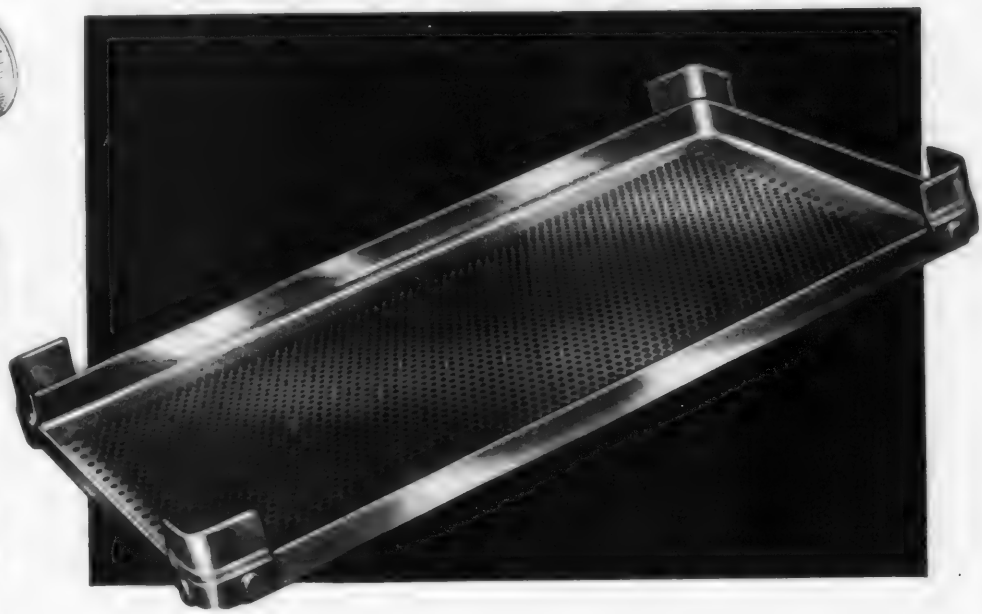
PERMUTIT
provides Demineralised Water
for Food Manufacture
For critical needs in food preparation, distilled quality water is essential, but distilled water is expensive: its production uses heat or steam.
The modern substitute is demineralised water, produced at only a small fraction of the cost of distillation by "Deminrolit" Ion Exchange.
"Deminrolit" plants are made in all sizes from Portable units to larger fixed installations, similar to the one shown here. If you would like to have them, we will gladly send full technical details.

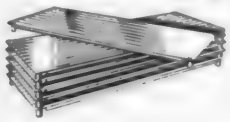
The **PERMUTIT Company Ltd.**, Dept. W.L.210, Permutit House, Gunnersbury Avenue, London, W.4. CHiswick 6431

The CHIEF ENGINEER says—

"Give them plenty of air with WARWICK...







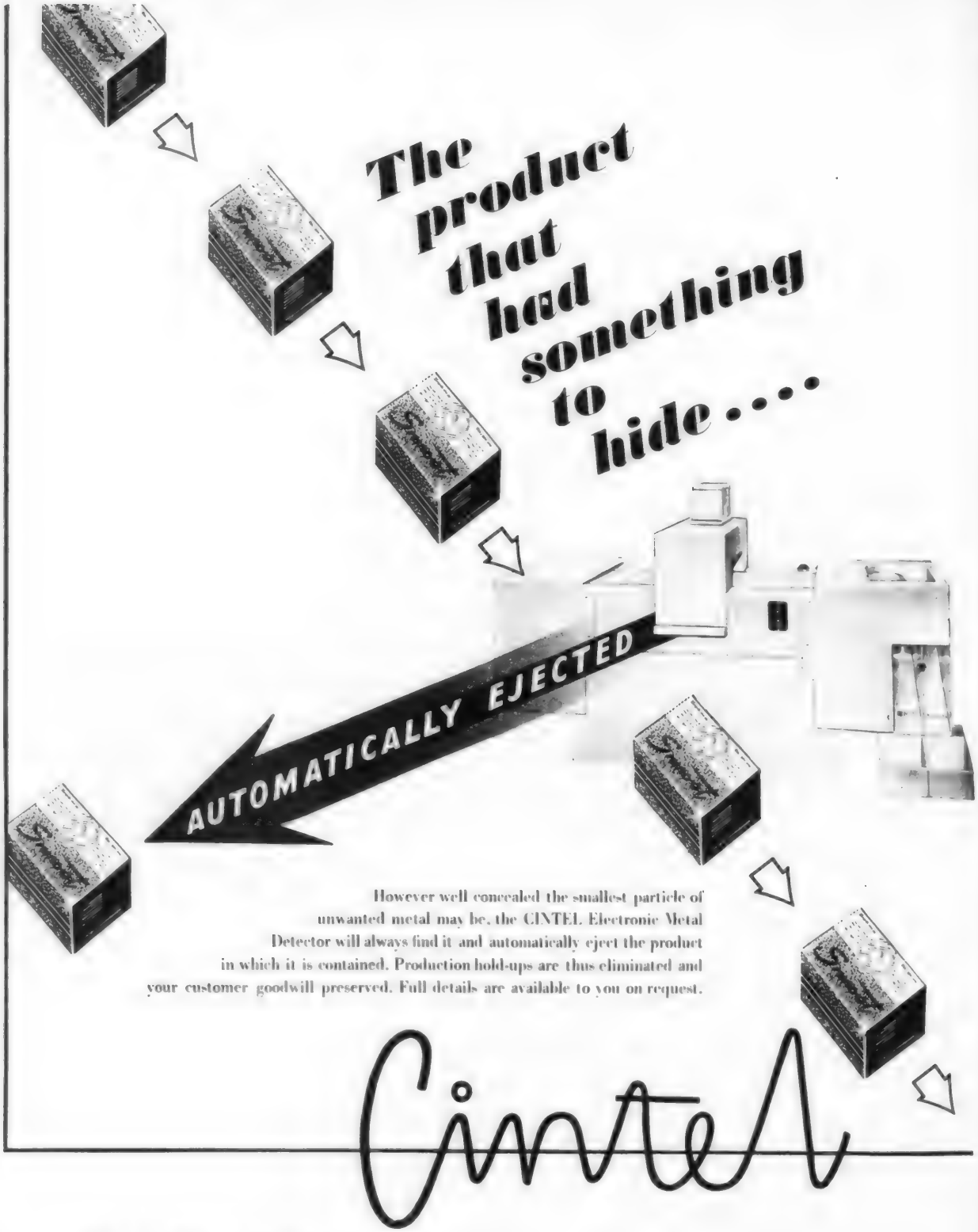
...Perforated Trays"

The illustration shows our standard tray T.27151 with perforated base and corner stacking brackets. Many of our extensive range of trays can also be supplied with perforated bases and stacking features—details given on request.

WARWICK PRODUCTION COMPANY LTD

IN ASSOCIATION WITH **ALMIN LIMITED** FARNHAM ROYAL BUCKS

BIRMINGHAM ROAD, WARWICK **TELEPHONE: WARWICK 693-696**



However well concealed the smallest particle of unwanted metal may be, the CINTEL Electronic Metal Detector will always find it and automatically eject the product in which it is contained. Production hold-ups are thus eliminated and your customer goodwill preserved. Full details are available to you on request.

Cintel

CINEMA-TELEVISION Ltd.

WORSLEY BRIDGE ROAD · LONDON · SE26

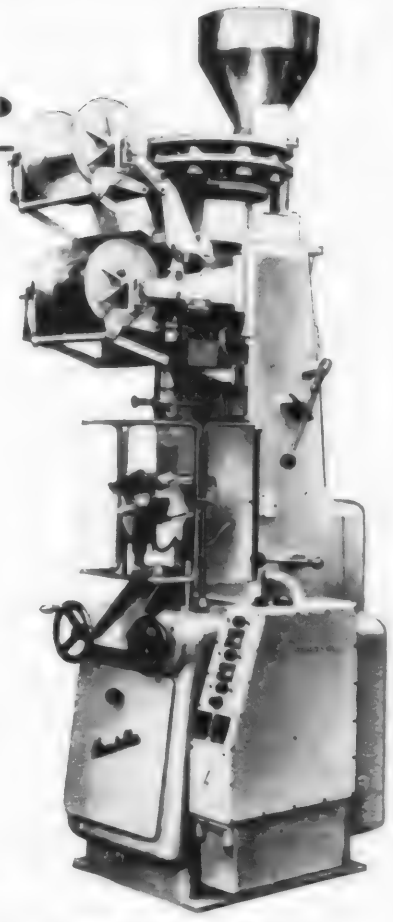
Telephone HITher Green 4600

A Company within the J. Arthur Rank Organisation

SALES AND SERVICING AGENTS: F. C. Robinson & Partners Ltd., 122 Seymour Grove, Old Trafford, Manchester, 16 · Hawnt & Co., Ltd., 59 Moor St., Birmingham, 4 · Atkins, Robertson & Whiteford Ltd. 100 Torrisdale Street Glasgow, S.2

AUTOMATIC BAG PACKAGING

HANSELLA TRANSWRAP



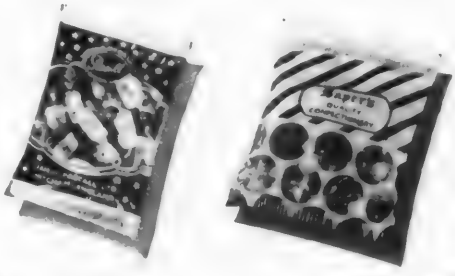
BAG FORMING
from the reel
of
Heat Sealing film **MSAT**
Heat Sealing coated papers or foils
Films, papers or foils laminated with
Pliofilm, Polyethylene, PVC or Saran

BAG FILLING

	with	**SOLIDS**
		GRANULES
by Weight		**POWDERS**
Volume		**LIQUIDS**
or Count		**SEMI-LIQUIDS**

BAG SEALING
Pillow type
Fin Seal type

COMPLETE IN ONE MACHINE



Bag Sizes (Type 125A):
Min. $2\frac{3}{8}$" square
Max. 5" x 7"

Hansella

Sole Sales Agents:

BRAMIGK & CO. LTD.

MIKRO HOUSE, 15 CREECHURCH LANE, LONDON, E.C.3
Telephone: AVEnue 4822

Crofts

"RITESPEED"

GEARED MOTORS AND REDUCTION GEARS

Immediate Delivery from Production Line

to your Production Drive

Any combination of motor, gear ratio and mounting position can be supplied. Units up to 20 H.P. are available from stock, larger sizes on quick delivery. Ratios up to 82-1.

Write Now for Publication No. 5329·5330/ 14
or Phone BRADFORD 65251 for immediate attention.

Crofts (ENGINEERS) LIMITED. BRADFORD 3. ENGLAND

WD 166

PHONE 63251 (15 LINES) GRAMS "CROFTERS BRADFORD"

—for QUICK deliveries of all

ENGINEERING SUPPLIES

including

COCKS & VALVES
PACKINGS, JOINTINGS
BELTINGS, VEE-ROPES
OILS & GREASES
HOSES, FITTINGS, etc.

HOP 8022
25 lines

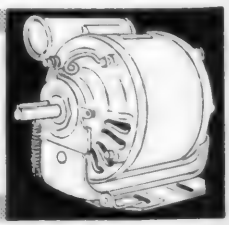
Write or 'phone

W. H. WILLCOX & CO. LTD
SOUTHWARK STREET, LONDON, S.E.1

Let us mince matters

Electric mincing machines, shredders, mixers and potato peelers are amongst many examples of how fractional horse-power can help the butcher, the baker, the dairyman and the farmer. A Crompton Parkinson motor, taking very little space and current, replaces the drudgery of old, and does the work in a fraction of the time. Where a little horse power can help, C.P. have a fractional motor that will give reliable and efficient service for years to come.

Crompton Parkinson LIMITED



ELECTRICAL EQUIPMENT

A good name for Electric Motors

CROMPTON PARKINSON LTD · CROMPTON HOUSE · ALDWYCH · LONDON · W.C.2 · TELEPHONE : CHANCERY 3333.

Rippatape

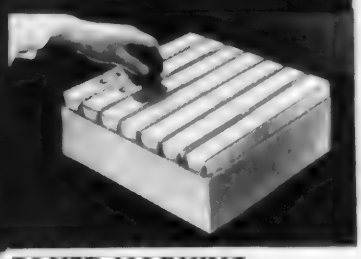
TRADE MARK

Quick-Tear

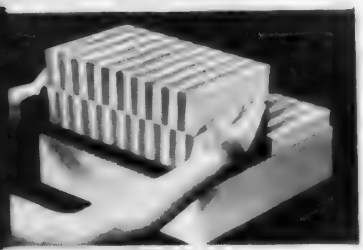
FOR CORRUGATED AND FIBRE BOARD CONTAINERS

Rippatape

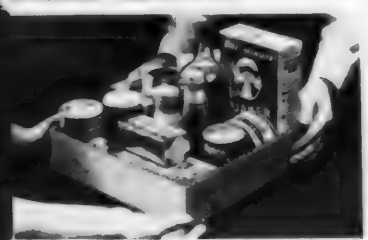
Paynes is a new method of quick and easy opening of containers



EASIER MARKING



EASIER REMOVAL



HANDY RE-USE OF CONTAINERS

Pull Tear-Tab on Container Wall and "zip" its open...

P. P. PAYNE & SONS LIMITED

HEAD OFFICE & FACTORIES
HAYDN ROAD, NOTTINGHAM
Telephone: NOTTINGHAM 66648

LONDON OFFICE & SHOWROOMS
BUSH HOUSE, LONDON W.C.2
Telephone: TEMPLE BAR 5964

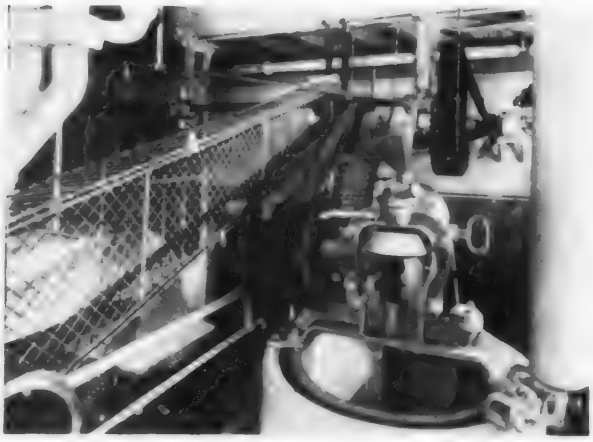
COMPANIES OVERSEAS

P. P. Payne & Sons (Canada) Ltd.,
468 King Street West, Toronto 2B,
Ontario, Canada.

P. P. Payne & Sons (South Africa) Ltd.,
404/5 Safric House,
Corner Eloff & Plein Streets,
Johannesburg, South Africa.

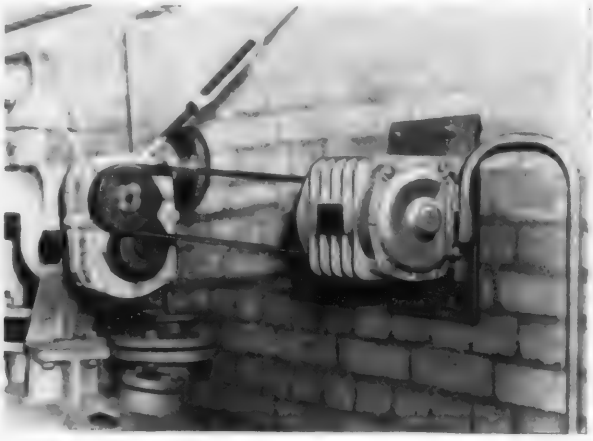
P. P. Payne & Sons (Australia) Ltd.,
545 Pacific Highway,
Crows Nest, N.S.W.
Australia.

NOW! SPACE IS NO PROBLEM IN SPEED REDUCTION



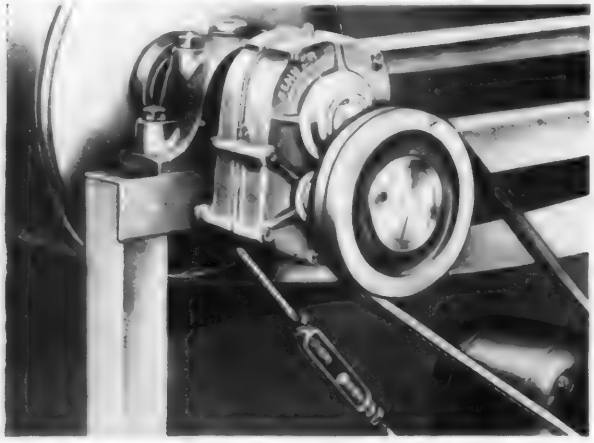
THE OLD METHOD.

A nationally famous firm of manufacturing chemists had the problem of driving chemical mixers at 60 r.p.m. A base mounted gear box was impractical and a cumbersome and expensive double reduction overhead drive had to be used.



THE NEW METHOD.

A Torque-Arm shaft mounted speed reducer was installed on top of the mixer driven through a Taper-Lock V-Drive by a wall mounted motor. Advantages: clean safer drive, economy in space, simplified maintenance, more useful power transmitted.



TORQUE-ARM CAN HELP YOU TOO!—

Space limitations no longer prevent you installing a speed reducer. The Fenner Torque-Arm Reducer mounts direct on the driven shaft and can be driven through any V-Belt Drive. It delivers up to 97% of power to output shaft. No motor base or slide rails are required, no flexible couplings needed. It is suitable for the majority of slow speed drives.

TECHNICAL LITERATURE IS AVAILABLE.

Literature giving all the facts about Fenner Torque-Arm Speed Reducers is available . . . send for your copy TODAY. Fenner Technical Advisory Service will be glad to consider your Speed Reduction problems and advise on the suitable application of Torque-Arm Speed Reducers.

J. H. FENNER & CO. LTD. · HULL · ENGLAND

See Torque-Arm demonstrated at the B.I.F. Castle Bromwich — May 2nd to 13th. FENNER STAND D406.

FENNER

OF HULL

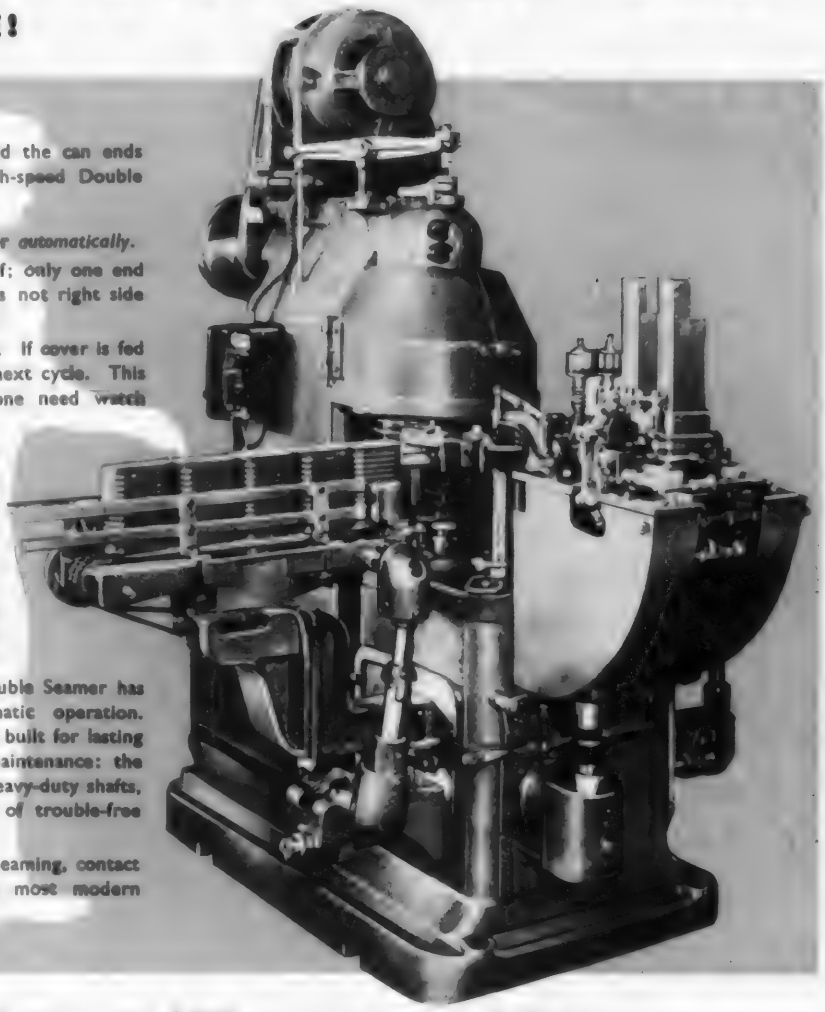
FIRST WITH TORQUE-ARM SHAFT SHAFT MOUNTED *MOUNTED SPEED REDUCERS IN THE U.K.*

ONE *inexperienced attendant working with this*

BLISS HIGH-SPEED DOUBLE SEAMER

WILL PRODUCE 80 to 120 SQUARE OR IRREGULAR-SHAPED CANS

PER MINUTE!



- All the attendant has to do is feed the can ends into the magazine. The Bliss High-speed Double Seamer does the rest—
  - Can ends are fed to the Seamer *automatically*.
  - End feed is positively foolproof; only one end can be fed at a time; if end is not right side up, it is rejected *automatically*.
  - If no cover is fed, no can is fed. If cover is fed but no can, cover is used on next cycle. This is completely automatic; no one need watch the work.
  - The Seamer uses ends with *straight* flanges, eliminating the need for use, unless preferred, of more costly ends with started or curled flanges.
  - Seaming heads are available with either "clover leaf" seaming rolls or with specially-designed round rolls and developed cams.

Yes, everything about the Bliss Double Seamer has been designed for simple automatic operation. What's more, the seamer has been built for lasting performance with a modicum of maintenance: the rigid base and body structure . . . heavy-duty shafts, bushings and bearings mean years of trouble-free operation.

If you want dependable high-speed seaming, contact Bliss for complete details on this most modern double seamer.

E. W. BLISS (ENGLAND) **LTD., CITY ROAD, DERBY**

Telephone: DERBY 45801

London Office: 2/3 THE SANCTUARY, WESTMINSTER, S.W.1 Telephone: ABBEY 3651

B/32

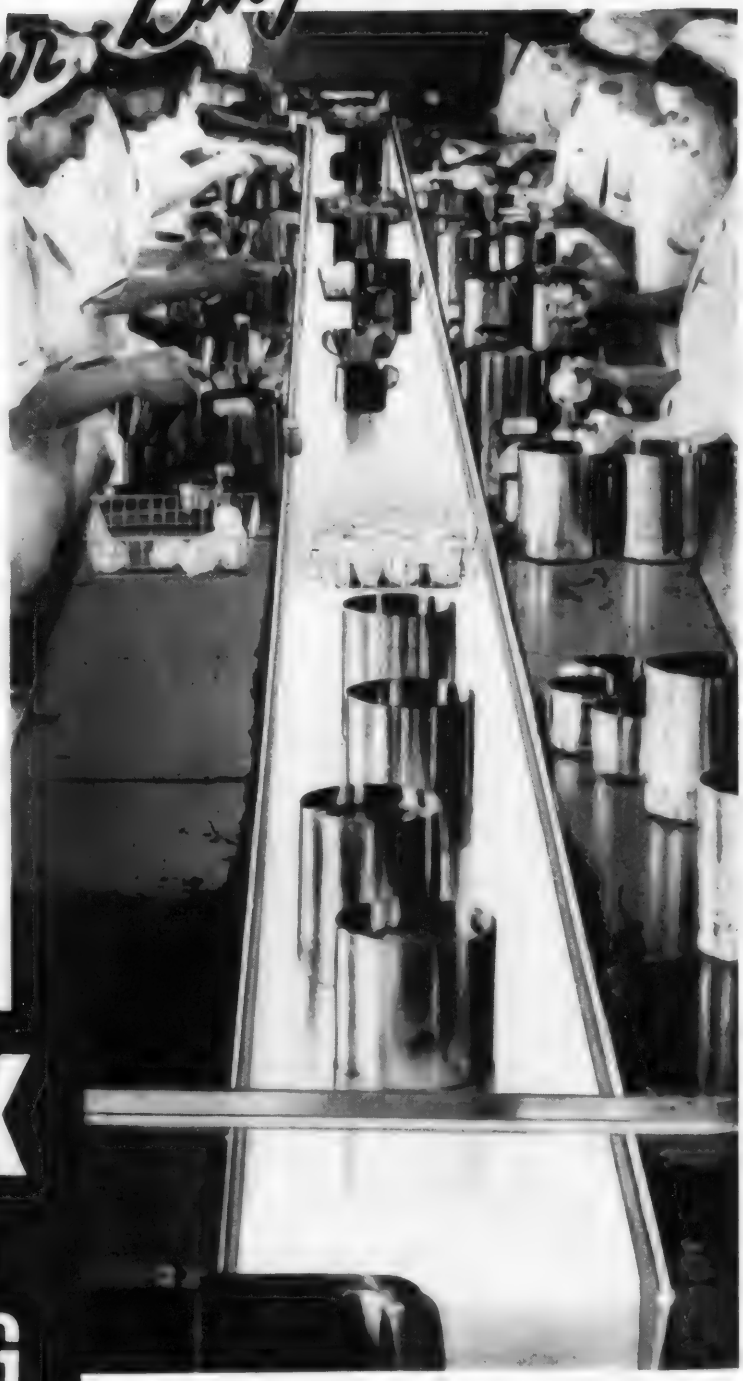
BLISS

on your machine is more than a name . . . *it's a guarantee!*

BLISS CAN AND CONTAINER MAKING MACHINERY

SLITTERS · BODYMAKERS · FLANGERS · SEAMERS · ROTARY SHEARS · STRIP FEED PRESSES

Reduce your Bug Count ★



★ Textile core covered with white smooth flexible plastic

★ Wears smooth not 'woolly'.

★ Can be cleaned in a flash.

★ Highly resistant to oils, fats, greases, acids and alkalis.

★ Odourless and tasteless.

Supplied in any number of plies up to 60".

ANOTHER RIL PRODUCT

LEONEX
Non-Toxic
FOOD BELTING

Write now for full particulars

RUBBER IMPROVEMENT LIMITED · RILEX WORKS · WELLINGBOROUGH · NORTHANTS

For light, bright, lasting equipment to meet the highest standards of hygiene—

PHŒNIX HESTON EQUIPMENT CO. LTD. *is the answer*

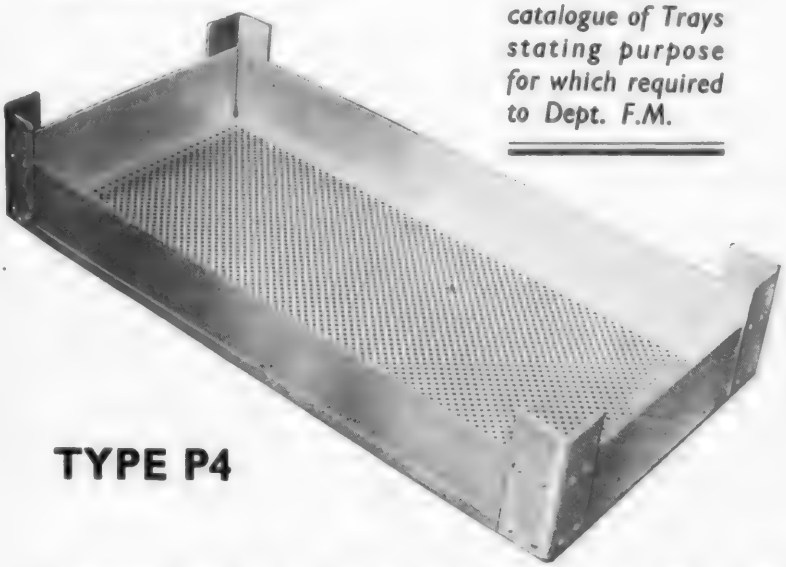
Phœnix Trays have been supplied to answer many specific requirements in the food and confectionery industries. In every instance their supreme fitness for the job has been proven in lighter work, easier cleaning, rigid interstacking and sturdy service.

ALUMINIUM PRESSED TRAYS

These trays have the great strength of high quality aluminium, plus the light weight that goes with it. Used widely for Biscuit and Cake processing, they have many other applications in manufacture when made to the dimensions required, with special features incorporated to customers' wishes. They can be made to interstack or not, and are the economical answer in hygiene, long service and easy cleaning.

TYPE Pr 1

Send for illustrated catalogue of Trays stating purpose for which required to Dept. F.M.



TYPE P4

A NEW *DIAMOND MESH* PERFORATED COOLING TRAY

Precision manufactured in highest grade aluminium with perforated base integral with sides and ends. Reinforced corner angles are designed for accurate interstacking, leaving lifting space between stacked trays for easy handling. Used for many purposes where cooling and hygiene are of paramount importance, e.g., Restaurant crockery trays; Processing with sugar confectionery; Nut sorting and a wide variety of other uses.

HESTON EQUIPMENT COMPANY LTD

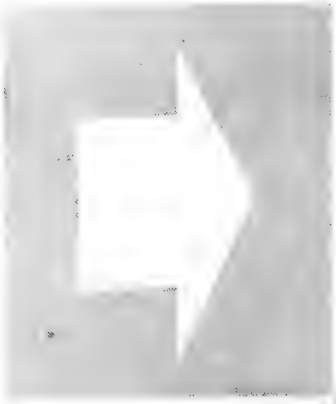
1 BUCKINGHAM PALACE MANSIONS · LONDON · S.W.1

Works: Heston Airport, Middlesex. ***Telephone: SLOane 9934-5-6***

MEMBER OF THE HESTON GROUP OF COMPANIES

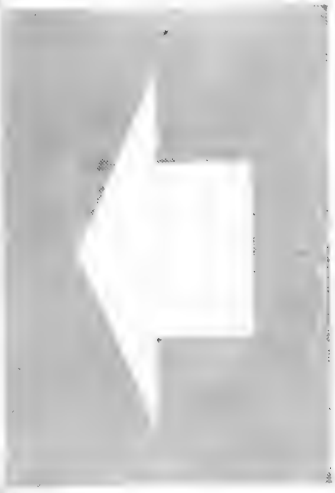
I.C.I. DENDRITIC SALT

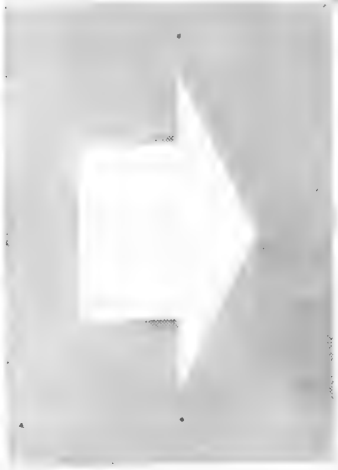
—a NEW fine grade for foodstuffs



I.C.I. Dendritic Salt is a fine vacuum salt with a new crystal shape. It is soft and floury, with the following distinctive qualities—which are of special advantage in many applications in the food and dairy industries :

- Outstanding non-caking properties
- High purity—99.6% sodium chloride
- Blends well with other finely-divided materials
- Low bulk density—ensuring good covering power
- Rapidly soluble in water

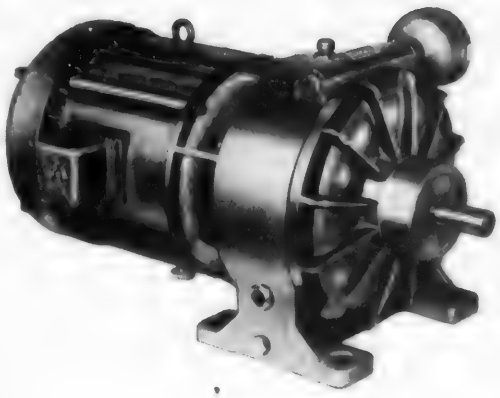




I.C.I. Dendritic Salt is of particular interest to users of Dairy or fine Crystal salt, since it not only offers technical advantages but is also cheaper.

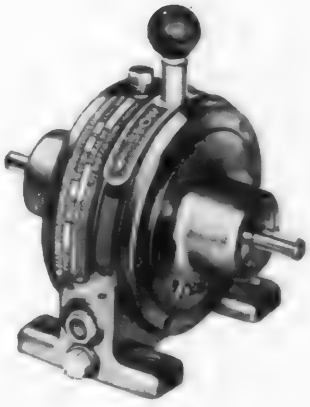
Imperial Chemical Industries Ltd. are the sole manufacturers of Dendritic Salt, which is protected by patents in Great Britain and other countries throughout the world.

IMPERIAL CHEMICAL INDUSTRIES LTD.
LONDON, S.W.1

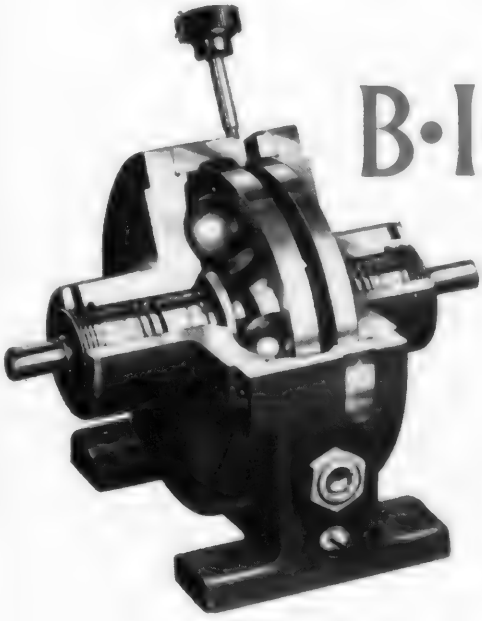


visit us

at stand D-257



B·I·F Birmingham



Kopp

INFINITE SPEED VARIATION
from ¼ h.p. to 14 h.p. FINGERTIP CONTROL

ALLSPEEDS LIMITED · OAKENSHORE WORKS
CLAYTON-LE-MOORS · ACCRINGTON · LANCASHIRE
TELEPHONE ACCRINGTON 3214 (3 LINES)

LONDON: 59 PARK ROAD NORTH · ACTON · W.3
TELEPHONE ACORN 7150

SCOTLAND: P.O. BOX No. 1 · CLARKSTON · GLASGOW
TELEPHONE BUSBY 2735

LOOK AT THIS MESS SIR— I'M AFRAID THE GOODS BELOW ARE RUINED !
WE'VE GOT MORE TROUBLE WITH YOUR PRODUCT — CANCEL OUR ORDERS UNTIL YOU CAN ASSURE US THAT THE CONTAINERS WON'T LEAK !
WHAT ! ANOTHER COMPLAINT ? WE MUST STOP THESE LEAKAGES NOW OR WE'LL BE LOSING MORE BUSINESS —
GET U.G.B CLOSURE DIVISION ON TO THIS RIGHT AWAY— WE MUST HAVE THE BEST ADVICE AND SERVICE.
NO LEAKAGES NOW— AND WHAT AN AMAZING IMPROVEMENT IN SALES APPEAL THESE NEW CLOSURES HAVE MADE !
U G B
CLOSURE DIVISION

UNITED GLASS BOTTLE MANUFACTURERS LTD

8 LEICESTER STREET, LONDON, W.C.2

Telephone: GERRARD 8611 (18 Lines) *Telegrams:* UNGLABOMAN, LESQUARE, LONDON

99.9% recovery of solids with— BLAW KNOX

'Buflovak' Evaporators

You are certain to get back 999 lbs. from each 1000 lbs. of recoverable materials fed to "BUFLOVAK" Evaporators. That rate of recovery is constantly achieved in actual operation.

"BUFLOVAK" Stainless Steel Food Product Evaporators set new standards in profitable production of highest quality concentrated food products with natural flavour, good colour, smooth uniform texture, and good body. They are manufactured in types and capacities to meet all requirements and their efficient operation is maintained with minimum supervision, whilst cleaning and sterilizing are easy, thorough and positive.

Right: BLAW KNOX Stainless Steel Double Effect EVAPORATOR INSTALLATION for food products.

Above: Upper chamber and heating tubes, showing complete accessibility for cleaning when the hinged cover is swung open.

LET'S TALK IT OVER

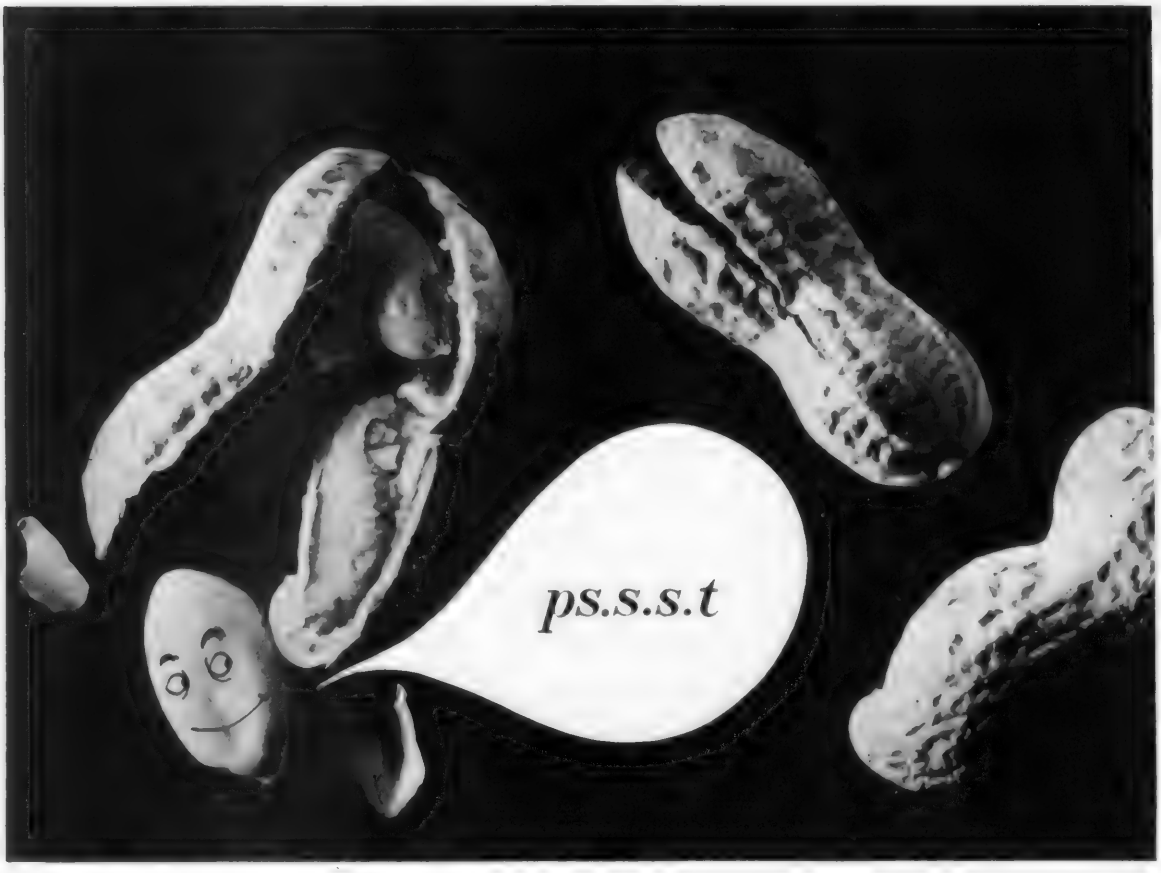
Why not discuss your processing problems with Blaw Knox Chemical Engineers? They will be pleased to confer with you.

EVAPORATORS · DRYERS (ATMOSPHERIC AND VACUUM)
PROCESSING KETTLES · FLAKERS · CONDENSERS
SPECIAL PROCESSING EQUIPMENT

BLAW KNOX

BLAW KNOX LIMITED

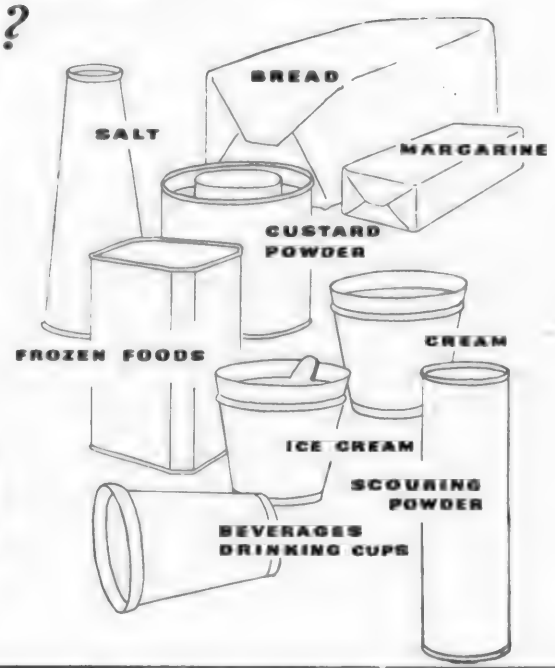
BLAW KNOX LTD. (Box 112) 90/94 Brompton Rd., London, S.W.3. *Tel: KENsington 5151. Grams: Blawnox, Southkens, London. Cables: Blawnox, London*



My packaging problem's solved . . .
is yours?

WAXED PAPER CUPS · WAXED & FOIL WRAPPERS · COMPOSITE & METAL CONTAINERS · FROZEN FOOD PACKS METALLISED PAPER BOTTLES

Whatever your demands on design, efficiency and economy



the answer is Naturally

GEEMANCO

CONTAINERS

THE GEE MANUFACTURING CO. LTD., PHOENIX WORKS, FAZAKERLEY, LIVERPOOL 9

Flavours with a difference!

They are TRUE!
PERSISTENT!
ECONOMIC!

WILTELL (REGD) Products

THE BIRMINGHAM CHEMICAL CO., LTD., WILTELL WORKS, LICHFIELD.
Telephone: LICHFIELD 2166 (3 lines) *Telegrams:* WILTELL, LICHFIELD.

Is your mixer **tailor-made** for the job ?

B I F 2-13 May
CASTLE BROMWICH BIRMINGHAM
SEE OUR EXHIBIT
ON STAND No. D349/244

talk to **GARDNERS** of Gloucester

EVERY MIXER supplied by Gardners is tailor-made for the job it has to do. The agitator, for instance, can take many forms. The number of blades, how they are spaced, the inclusion of wires or vanes is all a matter of whether your mixture is wet or dry, coarse or fine, sticky or crumbly. Whatever your problem, it will get individual attention from Gardners to ensure perfect mixing, sifting, grinding or drying. Send along sample materials for a free and confidential report on methods of processing. Then you'll know exactly what the proposed machines will do.

The Gardner Double Cone Mixer

The answer for dry products liable to damage by mixers having internal agitators. Imparts rolling and folding motion to material to give complete blending. Just one of a complete range of mixers by Gardners.

Send for the Gardner List giving details of 22 types of sifting, mixing, drying and grinding machines.

GARDNERS *of Gloucester*

Wm. GARDNER & SONS (GLOUCESTER) LTD., BRISTOL ROAD, GLOUCESTER
(A subsidiary of the Gloucester Railway Carriage & Wagon Co. Ltd.)
Telephone : Gloucester 21261 . Telegrams & Cables : 'Gardner, Gloucester'

London Office : 1 ALBEMARLE STREET, LONDON, W.1. *Telephone : Grosvenor 8206*

Let's get down to the fats . . .

TAKE ICE CREAM, FOR INSTANCE. The fact is that fat is a most important constituent of ice cream. Quite apart from the legal requirements, under which ice cream must contain at least 5% of fat, every manufacturer knows that ice cream not only needs fat, but indeed a very special kind of fat. It might be an unsalted margarine or a white shortening, depending upon the flavour and body required. Generally speaking, unsalted margarines give flavour and a fine texture, while white shortenings make for maximum over-run and a slightly firmer body.

We have been specialists in the manufacture of margarines and shortenings for a long time so we feel we are in a position to put all the relevant fats—and our long and wide experience—before you. Whatever your special ice cream requirements, you're sure to find exactly the right fat in the CBC range.

So if you manufacture ice cream and would like to get down to the fats with us, please telephone or write to our Sales Director who will gladly give you all the information you need.

Check your fats with CBC

CRAIGMILLAR AND BRITISH CREAMERIES LIMITED

SUSSEX HOUSE, QUEEN STREET, LONDON, E.C.4. Telephone: CITy 6783

CBC

CCT 29-5-100

The perfect pastry producer

Introducing The JOHN HUNT POWER PASTRY ROLLER

SPECIALLY DESIGNED TO FILL A LONG FELT NEED FOR A MEDIUM SIZED POWER ROLLER CAPABLE OF HANDLING LARGE QUANTITIES OF PASTRY AND YET NOT SO WASTEFUL OF SPACE TO MAKE IT IMPRACTICAL FOR THE AVERAGE BAKER

Incorporates the following strong features . . . .

- The MAIN BEARINGS of the Rollers and reverse gearing, etc., are fitted with self-aligning ballraces, thus reducing friction and the need for lubrication to an absolute minimum.
- PRECISION CUT GEAR WHEELS are used throughout, and the train of gears which drive the Top Roller are in constant full mesh irrespective of the position of the Top Roller. This is a very important feature.
- The REVERSE MECHANISM which is purely mechanical is controlled by a Safety Guard of very strong construction, the forward and reverse motions being obtained by means of a double case-hardened dog-clutch. This has proved smooth in action, yet gives an absolute positive drive with no chance of slipping.
- The TOP ROLLER is raised and lowered by means of totally enclosed bevelled gears.
- The MOTOR AND WORM REDUCTION GEAR UNIT is mounted in a convenient position underneath the table, and is practically silent in operation. The ¼ h.p. motor is totally enclosed, is fitted with ball bearings, and is controlled by a push button starter mounted on the side of the machine The starter incorporates a thermal overload mechanism which trips out should the motor be overloaded, thus obviating any possibility of damage.
- The TABLES are supplied with special Noral Aluminium Sheeting which will not discolour the paste under any circumstances.

PRICE
£189
or confidential hire purchase terms can be arranged.

Send for Illustrated Leaflet and details to the Manufacturers:

JOHN HUNT (BOLTON) LTD
ALMA WORKS · RASBOTTOM STREET · BOLTON
TELEPHONE: BOLTON 5831-2 TELEGRAMS: HUNT 5831 BOLTON

"Bedtime with DRAYTON"

"My book says every kind of trap job wants a different kind of trap, Chief."

"I've got a book of bedtime stories, too, son."

"Ain't it true, Chief?"

"Tisn't so much not true, son, as not significant. What you might call flannel."

"How come, Chief?"

"We've got calorifiers, steam mains, unit heaters, drying rolls, autoclaves, moulding presses, 'sides jacketed pans and open steamers in the canteen, and heater batteries on the air conditioning plant. Drayton-Armstrongs are O.K. for those. We've no interstage evaporators or heavy oil tanks where we can't return the condensate, so those don't worry."

"But Chief, it says in my book —"

"'Nother time, my lad."

SUITABLE FOR ALL PURPOSES

Drayton-Armstrong Traps are equally suitable for all heating applications and for 99% of all industrial applications. They are available with body and cover construction for all pressures up to 900 psi, 900° Fahr.

IDEAL FOR STANDARDISATION

Drayton-Armstrongs are ideal traps on which to standardise. Owing to their long trouble-free life, only a small spares stock is required. Complete spares for 1,000 traps may be kept in a desk drawer with room to spare.

CHOICE OF VERTICAL OR HORIZONTAL CONNECTIONS

makes for ease of installation, with the minimum of fittings.

DRAYTON
STEAM TRAPS

Send for the Drayton-Armstrong book on trapping:

DA40

THE DRAYTON REGULATOR & INSTRUMENT CO. LTD., WEST DRAYTON, MIDDLESEX. *(West Drayton 2611)*

YOUR DEADLIEST WEAPON

against food infestation

Every food manufacturer knows how dangerous live insects or eggs can be in his raw materials and finished products, how they can multiply in the pack, how they can destroy goodwill at a stroke. Entoleter centrifugal machines offer complete protection against infestation. The whirling 'tornado' rotation kills insects at all stages of growth in powdered and granular foodstuffs.

Incorporated into your processing system, Entoleters will:

- ensure that raw material brings no infestation into your plant.
- protect ingredients during storage and processing
- safeguard your finished product before packing

Products handled include:
Cake-mixes · Cereals · Custard powder · Flour · Meals for cattle food · Invalid foods · Powdered soups · Semolina and similar free flowing materials.

For Improved Mixing.
The Entoleter's high-speed centrifugal action disintegrates any nodules and agglomerates, and disperses additives evenly throughout the mass to produce an intimate blend at rates up to 200 lbs. per minute.

Send for full information today.

Entoleter Centrifugal Machines DISTRIBUTED BY *Henry Simon Ltd* SIMON ENGINEERING GROUP

STOCKPORT ENGLAND

HS. 169

A Pectin for every purpose

ELPEX

The standard Apple Pectin. Completely starch-free, its high quality, clarity, and jel-making properties never vary.

NSF GRADE

A pectin of standard "Elpex" setting strength but specially prepared for the darker jams where maximum clarity is not essential.

XL GRADE

For specialised products such as Jelly marmalade. In colour and clarity, "X.L.Grade" replaces powdered pectins at less than half the cost.

and NOW!

LIQUID SLOW-SET PECTIN

Guaranteed setting temperature. Specially suited for 7's, 14's and bulk packs of jam where ordinary pectin causes caramelisation and pre-setting.

EVANS APPLE PECTINS

TWENTY-FIVE YEARS ago, William Evans & Co. pioneered the manufacture of Pectin in Great Britain. Their unique experience is freely available to jam makers through the Technical Advisory Service. Sample quantities for production testing will be sent on request.

WILLIAM EVANS & CO. (HEREFORD & DEVON) LTD., WIDEMARSH, HEREFORD

Telephone your enquiries—Hereford 2313

It will open your eyes

to easier cleaning!

Do you have difficulty in maintaining throughout your premises that constant high standard of cleanliness which now, more than ever, is an essential part of your business goodwill?
TEEPOL, the master detergent developed by Shell, will help you solve that cleaning problem.
Counters, slabs, shelves, utensils, floors and all other washable surfaces clean faster and easier with TEEPOL. This versatile modern detergent is always outstandingly efficient, always safe.
Wherever you use TEEPOL (which can be just about everywhere) it will give you maximum cleaning power and satisfaction at the lowest possible cost. Order a trial 4-gallon can to-day.

Teepol ***cleans just about everything!***

SHELL

Why not order a trial quantity from any of the following Distributors:

Black, Taylor & Cowell Ltd., Pelton Fell, near Chester-le-Street, Co. Durham.
Burton, Son and Sanders, Ltd., Waddington House, West Hill, Wandsworth, London, S.W.18.
Cleenol Products, 82 Fazeley Street, Birmingham 5.
Deodor-X Company of England Ltd., Cromwell Road, Ellesmere Port, Cheshire.
J. Evershed & Son Ltd., Dolphin House, Dolphin Road, Shoreham-by-Sea, Sussex.
Puragene Products Ltd., Hygiene House, George Street, Summertown, Oxford.
Sposs Products Ltd., 10 Sovereign Street, Leeds 1.
Stephenson Clarke Ltd., 59 St. Mary Axe, London, E.C.3.
Yare Industries Ltd., Suffling Road, Great Yarmouth.

T.C.7.

SHELL CHEMICALS LIMITED

"TEEPOL" *is a Registered Trade Mark*

You'll sell more margarine and butter when they are wrapped in fisher's FLAVOUR RETAINING foils
Foods wrapped in Fisher's Foils not only have a brighter sales outlook, but stay fresh and protected. Whether it's butter, margarine, cheese, or ice cream, it's *better wrapped* in Fisher's Foils. A laminate of Foil, Wax, and Vegetable Parchment paper is superior to any other material for the wrapping of these products; can be printed with attractive colours in Customer's individual designs, trade marks, etc. Write today for full details, prices and samples.
Margarine
BUTTER

FISHER'S FOILS LIMITED · EXHIBITION GROUNDS · WEMBLEY · MIDDLESEX · ENGLAND
TELEPHONE: WEMBLEY 6011
CABLES & GRAMS: LIOFNIT, WEMBLEY (ABC CODE 6TH EDITION)

M-W.81

STURTEVANT

4X Industrial Vacuum Cleaner

THE LATEST all-purpose cleaner particularly suitable for the food manufacturing industry where stringent hygienic conditions must be maintained. In addition to cleaning normal surfaces the 4X effectively removes dust and spillage from cracks, crevices and recesses which form good breeding grounds and lead to pest infestation.

The Sturtevant 4X is equipped with a vertical receiver incorporating a removable metal bin which traps the coarse materials, and a filter sleeve that holds the finer dust.

PUBLICATION W.5302 GIVING FULL PARTICULARS OF THIS MACHINE IS AVAILABLE ON REQUEST

■ ■ ■

Co-operation of Sturtevant technicians for individual cleaning problems is always available.

STURTEVANT ENGINEERING COMPANY LIMITED
SOUTHERN HOUSE · CANNON STREET · LONDON · E.C.4

M.S.B.

. . . improves all Sausage Products

★ **THE PERFECT ADDITIVE FOR ALL SAUSAGE PRODUCTS AND SMALL GOODS**

by maintaining constant ***factory freshness***

M.S.B. Stops shrinkage and loss of weight during cooking.

M.S.B. Improves colour and flavour.

M.S.B. Means more fat for better quality sausages.

M.S.B. In Brine cures quicker.

Post Coupon today for FREE SAMPLE Offer :

To **THE OPPENHEIMER CASING CO. (U.K.) LTD.**
159/165, Harrow Road, London, W. 2. *Tel.: PADdington 7431*

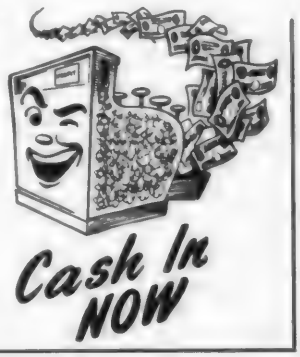
Please send me a free sample of M.S.B. and full details and prices for quantity.

Name

Address

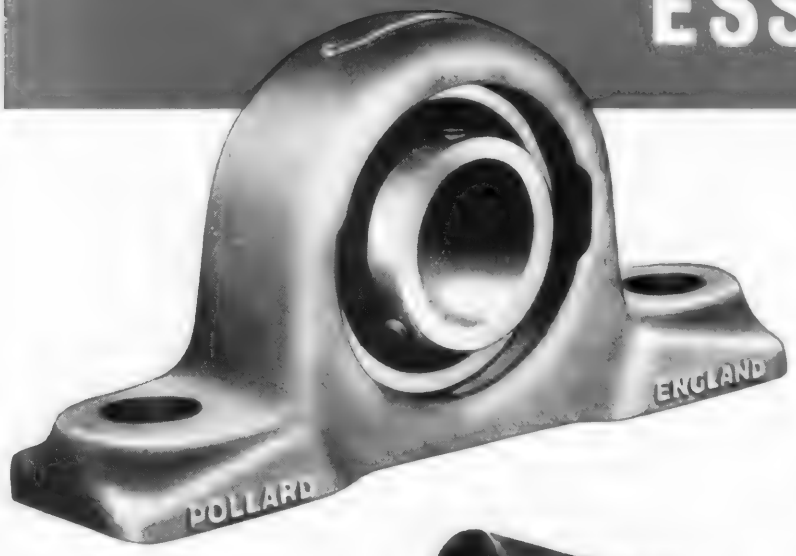
.....

F.M.4.55



Scottish Sales Depot: THORNYBAUK, FOUNTAINBRIDGE, EDINBURGH, 3. *Telephone:* FOUntainbridge 1403

where CLEANLINESS is ESSENTIAL



you require the

POLLARD SELF-LUBE

PLUMMER BLOCK

OR FLANGE UNIT

Ball Bearing

Self-Aligning

Self-Sealed

Self-Lubricated

The POLLARD "SELF-LUBE" sealed bearing design offers the MAXIMUM duty, for the MINIMUM of attention and outlay.

It can be stated that 90% of bearing failures are due to the ingress of foreign matter, and by reason of the great strides which have been made in the manufacture of special lubricants, it has been possible to provide a bearing mounting requiring no servicing whatsoever.

The one piece housing and solid sleeve, enables the bearing to be fitted as a complete unit, thereby eliminating the hazards of an exposed bearing. Further, the improved sealing devices are of the flexible type bonded to a metal insert, ensuring long trouble free service and are not called upon to align themselves to the malalignment of the bearing housing.

This bearing unit gives a life equal to, or greater than, the standard open type bearing of similar size, periodically lubricated, and is available from ½" to 4" shaft diameter.

Flange units incorporating the same advantages as outlined above are also available. The drawing on left, illustrates the flange unit design.

Catalogue SL/2/54 giving further details is available on application to Room G2, Technical Sales Department.

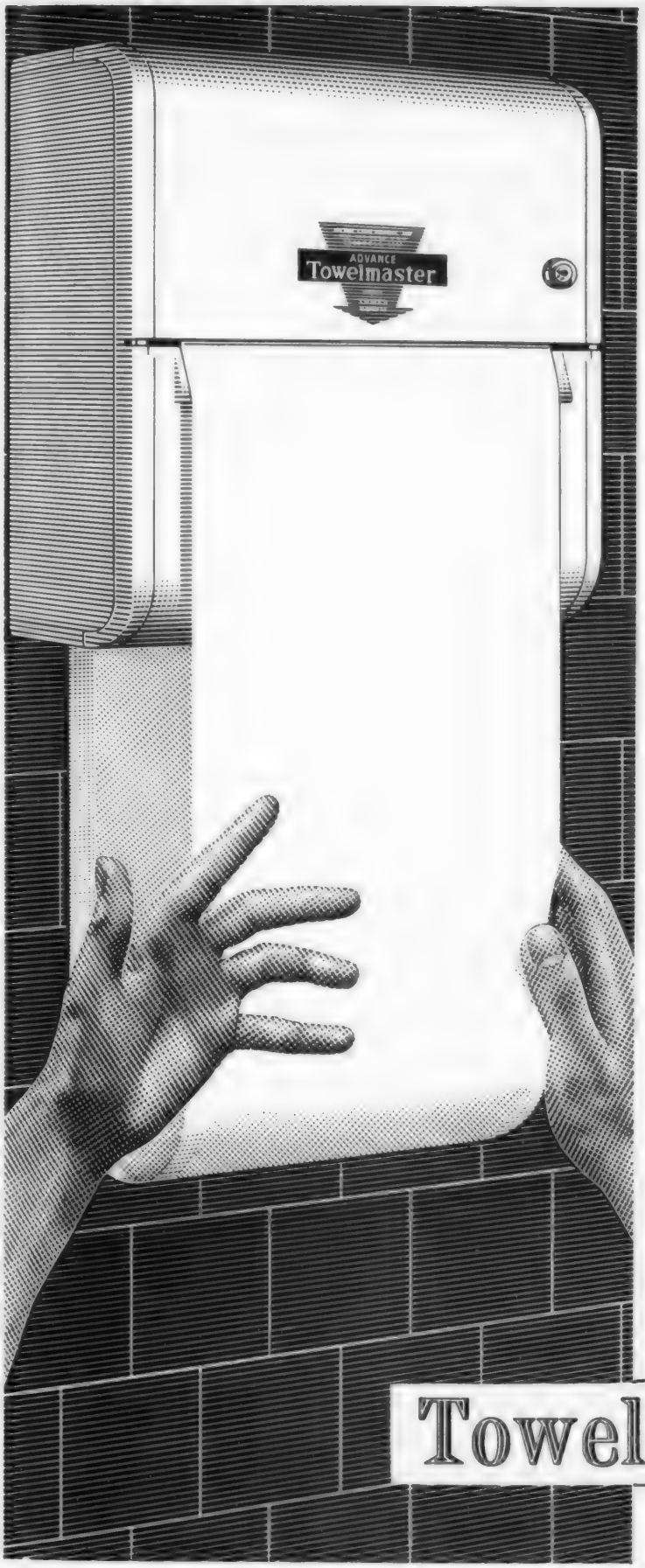
Pollard Bearings also manufacture Ball, Roller and Thrust Bearings (Cat. BRT 1053) Transmission Equipment including Plummer Blocks (Cat. TR.27/2) Clutch Withdrawal and Water Pump Spindle Bearings (Cat. CWFP/54) Max-Load Roller Bearings (Cat. MAX/54) Solid and Flexible Roller Bearings (CAT.RFX).

POLLARD BEARINGS LTD., FERRYBRIDGE, Knottingley Yorks. Tel. Knottingley 320 (5 Lines).

London Office : 6, St. James Place, London, S.W.1. Tel. Hyde Park 9248/9.

Canadian Pollard Bearings Ltd. 1103/5 Beaver Hall Hill, Montreal.

PO/1107



A clean soft dry towel for every pair of hands

How does the Towelmaster work?
A pull. Here's a length of laundry-fresh towel, enough and to spare for a really good dry. And as you pull, the used portion automatically winds into a separate compartment of the gleaming white Towelmaster cabinet. Nothing more efficient. Nothing more hygienic.

How much does the Towelmaster cost?
5/- per roll of towelling. Minimum usage only one roll per cabinet per week. Installation is free. Maintenance is free (two or more cabinets). No replacement charges. In fact there are no other charges whatsoever.

How much is the Towelmaster worth?
Those few shillings give 180 pairs of hands an honest-to-goodness dry. Benefit staff and visitors alike. Give you 45 yards of *goodwill*. And what an infinitesimal price to pay for a clean bill of health!

What are your particular needs? We'll be glad to discuss them—without obligation.

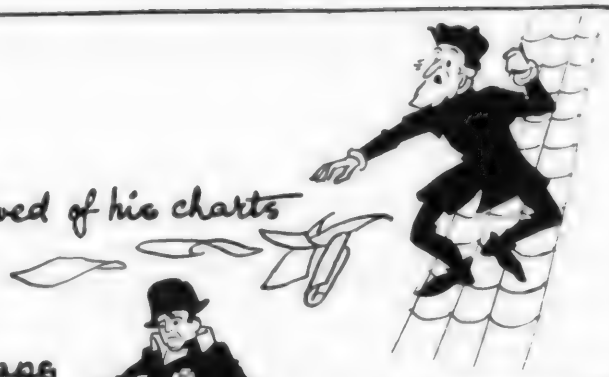
ADVANCE

Towelmaster

Advance Linen Services Ltd. (Dept.T28), Stratton House, Piccadilly, London, W.1. Telephone: Mayfair 8886

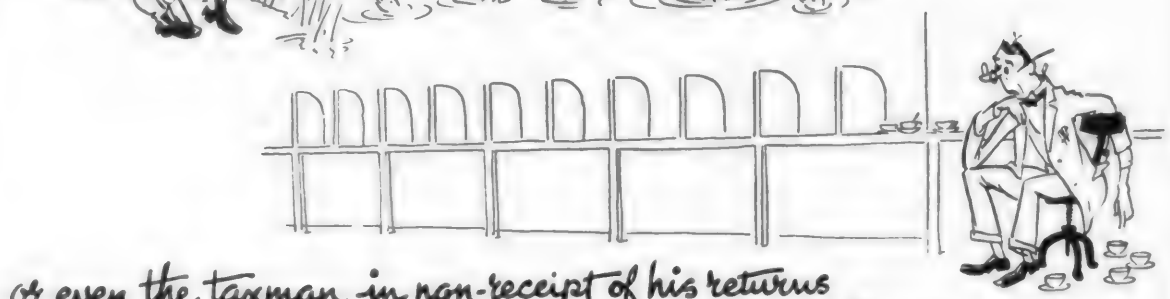
We can easily imagine

Christopher Columbus deprived of his charts



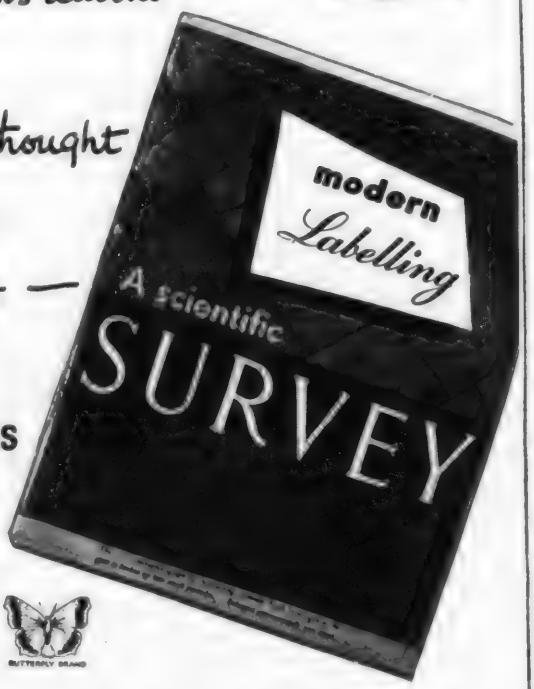
or Napoleon minus his maps

or Izaak Walton parted from his fly-book



or even the taxman in non-receipt of his returns

But
we are utterly shattered by the thought
of the Manufacturing Executive
without a copy of —



We therefore invite those
EXECUTIVES of MANUFACTURING CONCERNS
who have not already done so,
to send for one of the remaining copies
of this **IMPORTANT MONOGRAPH**

SAMUEL JONES & COMPANY LTD.
NEW BRIDGE STREET · LONDON · E·C·4 · CEN: 6500

...but we have a flair for Planned lighting

Some people excel at pottery—but *our* field is LIGHTING.... the design and construction of superior tungsten and fluorescent fittings—and their planning and positioning in the workshops of the world. In every case, Benjamin skill and experience provides the guiding hand behind good lighting. Write for more details — or ask for our Lighting Engineer to call.

better lighting by **BENJAMIN** REGD.

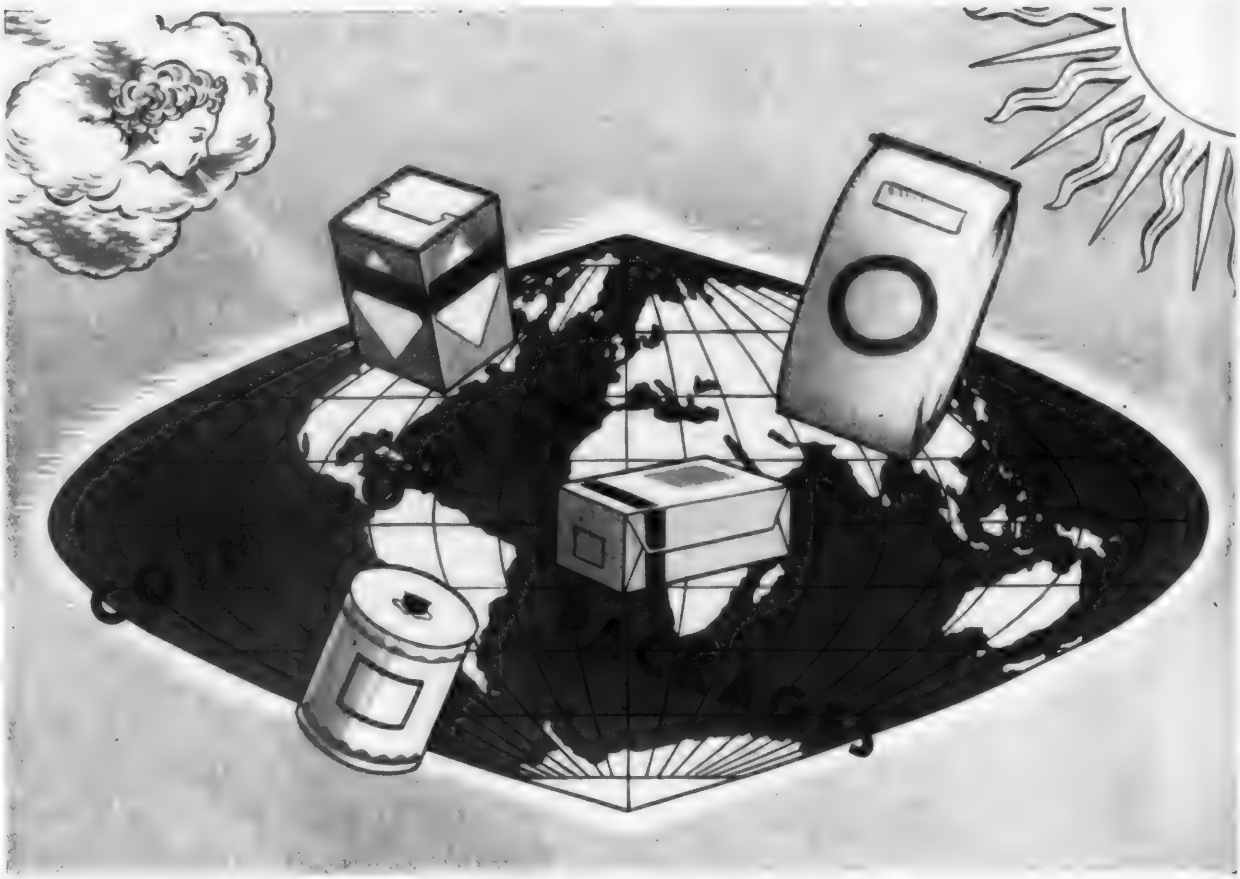
THE BENJAMIN ELECTRIC LTD. TOTTENHAM LONDON N.17

Telephone: TOTtenham 5252 (5 lines) *Telegrams: "Benjalect, Southtot, London"*

BIRMINGHAM: 5, Corporation Street, Birmingham 2. Tel. MIDLAND 5197.

LEEDS: 49, Basinghall Street, Leeds 1. Tel. LEEDS 25579.

SMEE'S 21/54



travel safely on the trade routes of the world

TELCON

One of the most revolutionary advances in protective packaging today is *TELCOTHENE — the thermoplastic pioneered by the Telcon organisation. Applied as a continuous coating to paper and board, it gives to these materials a new and tougher resistance to the varying climatic changes encountered in transit. It makes all kinds of goods better and more dependable travellers, ensuring their perfect condition on arrival. TELCOTHENE is hygienic, moisture-proof, non-toxic, heat-sealable, and will not support mould growth in tropical climates. Now being produced in the largest plant in the country, TELCOTHENE coated paper is attracting the interest of those who engage in the manufacture, packaging and distribution of foods.

**Telcothene—Polythene processed by Telcon to provide specific characteristics.*

TELCOTHENE
Coated Paper and Board

Product of the Plastics Division of

THE TELEGRAPH CONSTRUCTION & MAINTENANCE CO. LTD

Head Office: 22 OLD BROAD STREET, LONDON, EC2 *Telephone: LONdon Wall 7104*

Enquiries to: The Plastics Division, Farnborough Works, Green Street Green, Farnborough, Kent *Telephone: Farnborough Kent 3585*

EDWIN DANKS

SPECIAL VESSELS

FOR EVERY INDUSTRIAL PROCESS

including:

VULCANIZERS

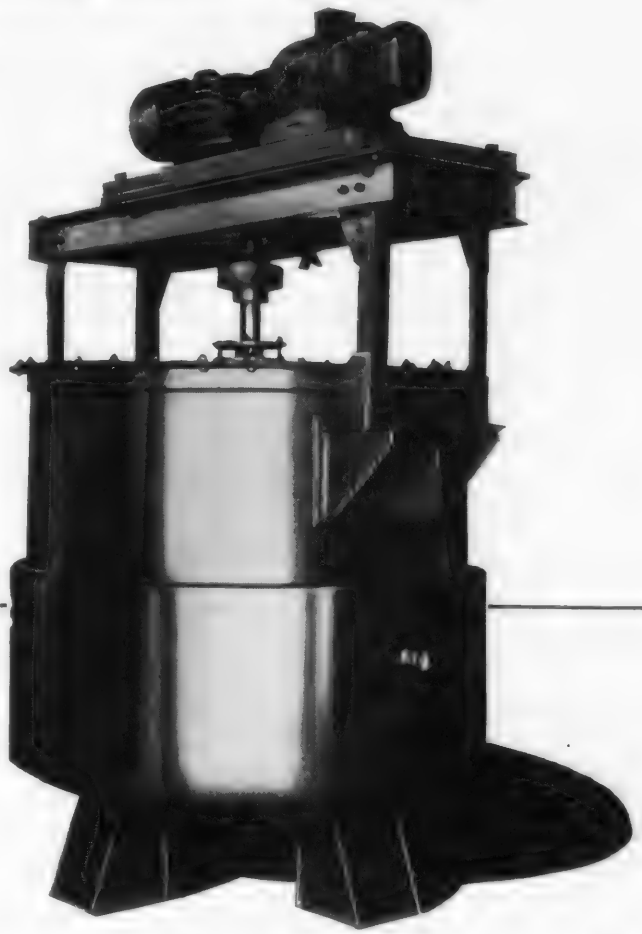
DE-VULCANIZERS

VERTICAL AND HORIZONTAL MIXERS

REVOLVING KIERS

HARDENING CYLINDERS

HEAT EXCHANGERS



The illustration shows a Steam Jacketed Mixing Pan 4′ 6″ diameter by 5′ 0″ deep, fitted with stirrer gear operated by electric motor and reduction gear. This type of mixing pan can be made in any size to satisfy special requirements and working conditions. Vessels of the same design are supplied with or without steam jacket, or, alternatively, fitted with internal steam coils.

Manufactured in mild steel, stainless steel or mild steel with integrally clad material of stainless steel or monel.

OTHER MANUFACTURES:
Edwin Danks High Velocity Economic Boilers and all other types of Shell Boilers, complete Boiler House Installations, "Oldbury" Chain Grate Stokers, Structural Steel-work.

EDWIN DANKS & CO. (OLDBURY) LTD

OLDBURY NEAR BIRMINGHAM

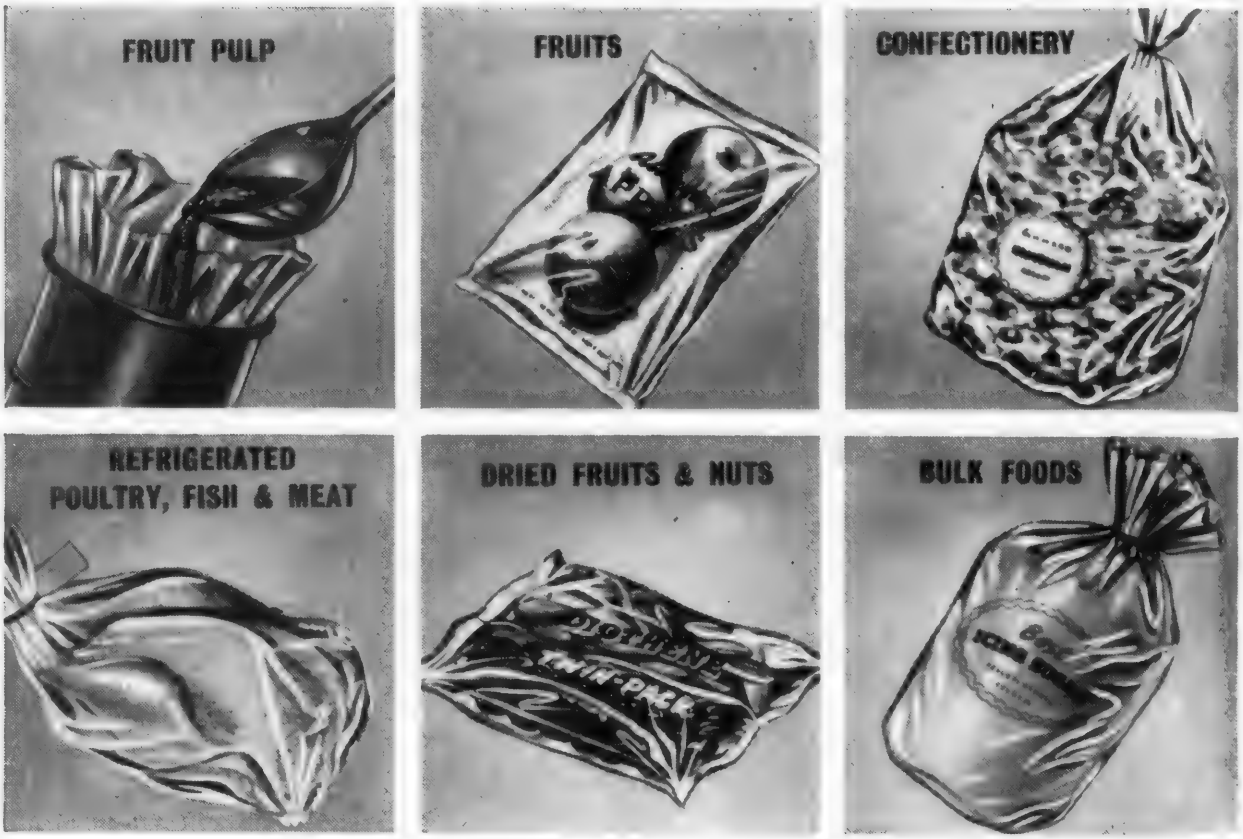
Telephones: Main Works, Broadwell 1381-6; Stoker Division, Brierley Hill 7731

LONDON · CARDIFF · MANCHESTER · LEEDS · NEWCASTLE · GLASGOW

Could Diothene be used

(Polythene)

for your product?



TRANSPARENT . . . for eye and appetite appeal . . .

TOUGH for protection . . . completely HYGIENIC

Diothene is a new, transparent flexible film with outstanding qualities for the packaging of food either in bulk or in packs for the counter. It is tough—does not easily tear or puncture; it is transparent—shows the contents attractively; it is sterile—has no odour, is non-toxic and cannot taint the contents. Diothene is moisture-proof, liquid and sift proof, can be sealed easily and is unaffected in deep-freeze storage. Diothene can be supplied in quite small bags suitable for counter sales or in heavy gauge bags suitable for large quantities.

Flexible Packaging Ltd at their factory at Portsmouth, manufacture the Diothene film, make up bags to exact specifications in any quantities and print in multi-colour—all under one roof.

This service assures prompt deliveries and competitive prices. And because Flexible Packaging Ltd are now a subsidiary of The Metal Box Company, users of Diothene can take advantage of Metal Box design and research facilities—the most extensive in the country covering packaging requirements.

MB DIOTHENE

DIOTHENE WILL KEEP IT CLEAN

THE METAL BOX COMPANY LIMITED

Flexible Packaging Division

THE LANGHAM • PORTLAND PLACE • LONDON • W.1 TEL: LANGHAM 2040

FP2233

designed for every drive

- Fractional horsepower motors 1 20 - 1 h.p.
- Drip proof, totally-enclosed, fan-cooled enclosures.
- Ball or sleeve bearings and a wide range of alternative mountings available.
- A.C. or D.C.

'ENGLISH ELECTRIC'

f.h.p. electric motors

THE ENGLISH ELECTRIC COMPANY LIMITED, QUEENS HOUSE, KINGSWAY, LONDON, W.C.2.

F.H.P. Motors Department, Bradford.

WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

FHP.2185

THE "MEASURED" QUANTITY?

. . . OR THIS

The addition of quantities of powder or granular material in any industrial process usually requires a certain degree of accuracy. Instead of guessing, weighing, measuring, etc., it is frequently better to use the material in tablet or pellet form !

One or more tablets (specially designed for the job) will stop waste of time, material and money.

Pharmaceuticals, Foods, Plastics, Catalysts, Light and Heavy Chemicals, Salt, Lime, Paints, etc., etc.

From $\frac{1}{8}$" to $2\frac{1}{2}$" in diameter.
From 8 milligrams to 4 ounces in weight.

In thousands or millions — In pounds or tons

There are hundreds of different shapes and sizes.

THOMPSON & CAPPER

WHOLESALE LTD.,

SPEKE HALL ROAD, LIVERPOOL

Telegrams: "Sanitas" — Telephone: Hunts Cross 1321

Works of Art!

Betts can help in so many ways to make a neatly turned out tube into a real work of Art !

First comes technical advice on the customer's problem (full information about B.S.I. specifications on collapsible tubes always available), then a designing service, finished drawings and high quality printing. When delivery is due, BETTS can offer storage facilities of the finished product allowing part delivery of bulk orders over any period.

Other facilities include special storage for delicate and hygienic tubes and advice on the supply and installation of filling machinery, in fact a complete and competitive service backed by 150 years of experience. All types of collapsible tubes and containers made up to customer's specifications.

Write or phone for further details.

BETTS AND COMPANY LIMITED

For Rigid Containers in Aluminium
and Collapsible Tubes in Tin-coated Lead, Aluminium and other Alloys

HOLLOWAY MILLS, Elthorne Road, Holloway, London, N.19.

Telephone: ARChway 4361. Telegrams: Betsanco Holway London Cables: Betsanco London.

LONDON · COLCHESTER · BORDEAUX · PARIS · MARSEILLES

INSTANT HOT WATER FROM STEAM

with automatic temperature control

Hot water, plenty of hot water from tepid to very hot, instantly, cheaply—that's what you want and that's what you get with a Leonard Thermostatic Steam Water Heater. Hot water is made only when it is wanted and where it is wanted. There are no heat losses through storage or radiation. No expensive piping or equipment required. The Leonard Thermostatic Steam Water Heater is easily and quickly installed—no upsets, no delays. It is widely used in Laundries, Tanneries, Textile Mills, Breweries, Dairies, and other Food Industries, Tinplate Works, etc.

Write for leaflet No. 9/S

WALKER, CROSWELLER AND CO. LTD. CHELTENHAM

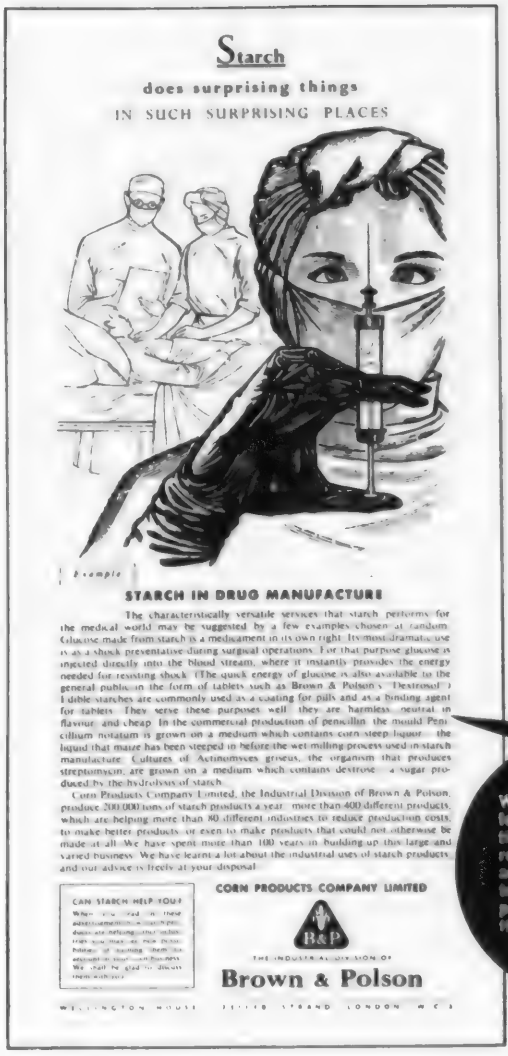
Leonard

(PATENTED)

FOR 80 INDUSTRIES

More than
400
Brown & Polson
Starch
Products

The deep knowledge and wide practical experience we have gained by our huge and varied production for other industries is your guarantee that our starch products for the preserving industry will always be the best that can be made. And we can promise you knowledgeable and disinterested advice whenever you care to discuss with us proposed new uses for starch products in your business.

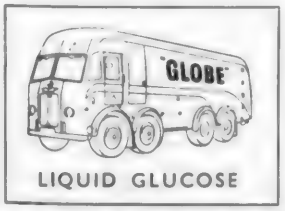

Starch
does surprising things
IN SUCH SURPRISING PLACES
Example
STARCH IN DRUG MANUFACTURE
The characteristically versatile services that starch performs for the medical world may be suggested by a few examples chosen at random. Glucose made from starch is a medicament in its own right. In most dramatic use is as a shock preventative during surgical operations. For that purpose glucose is injected directly into the blood stream, where it instantly provides the energy needed for resisting shock. (The quick energy of glucose is also available to the general public in the form of tablets such as Brown & Polson's "Dextrosol".) Edible starches are commonly used as a coating for pills and as a binding agent for tablets. They serve these purposes well: they are harmless, neutral in flavour, and cheap. In the commercial production of penicillin the mould Penicillium notatum is grown on a medium which contains corn steep liquor — the liquid that maize has been steeped in before the wet-milling process used in starch manufacture. Cultures of Actinomyces griseus, the organism that produces streptomycin, are grown on a medium which contains dextrose — a sugar produced by the hydrolysis of starch.
Corn Products Company Limited, the Industrial Division of Brown & Polson, produce 200,000 tons of starch products a year: more than 400 different products which are helping more than 80 different industries to reduce production costs, to make better products or even to make products that could not otherwise be made at all. We have spent more than 100 years in building up this large and varied business. We have learnt a lot about the industrial uses of starch products and our advice is freely at your disposal.
CAN STARCH HELP YOU?
CORN PRODUCTS COMPANY LIMITED
B&P
THE INDUSTRIAL DIVISION OF
Brown & Polson
WELLINGTON HOUSE
STRAND LONDON W.C.2

Watch the National press for advertisements like this one. When you read how starch products are helping other industries you may see new possibilities of turning them to account in your own business.

for you, in the Preserving Industry

Most jam manufacturers have encountered the problem of making jams that contain enough soluble solids to be satisfactory in quality, yet are not too sweet for their customers' taste and will not crystallise in storage. Most jam manufacturers are also aware that the best answer to this problem is to use less cane or beet sugar (sucrose) in their jams and make up the required soluble solids content with "Globe" liquid glucose. Glucose provides abundant food energy but is not as sweet as sucrose. When glucose is used in jam making to replace some of the sucrose it reduces excessive sweetness without reducing food value; it brings out the natural flavour of the fruit; it helps the jam to set; and it prevents crystallisation.

"Globe" liquid glucose is made from starch by Corn Products Company Limited—the Industrial Division of Brown & Polson—and we make the starch, too. Our careful control of every manufacturing process from the grain to the finished product is your assurance of the quality and purity you require in your preserves.



CORN PRODUCTS COMPANY LIMITED

THE INDUSTRIAL DIVISION OF B&P Brown & Polson

WELLINGTON HOUSE, 125-130 STRAND, LONDON, W.C.2

Reigate

Brand

ESTABLISHED 1841

PURE VEGETABLE CHOCOLATE COLOUR

EXTRA CONCENTRATED

This colour is guaranteed to be entirely natural and free from any artificial or aniline dye. This is the strongest, richest and most economical preparation of its kind, and is very stable under high temperature.

Recommended for: **FONDANT, ICING, SWISS ROLLS, SPONGES, Etc.**

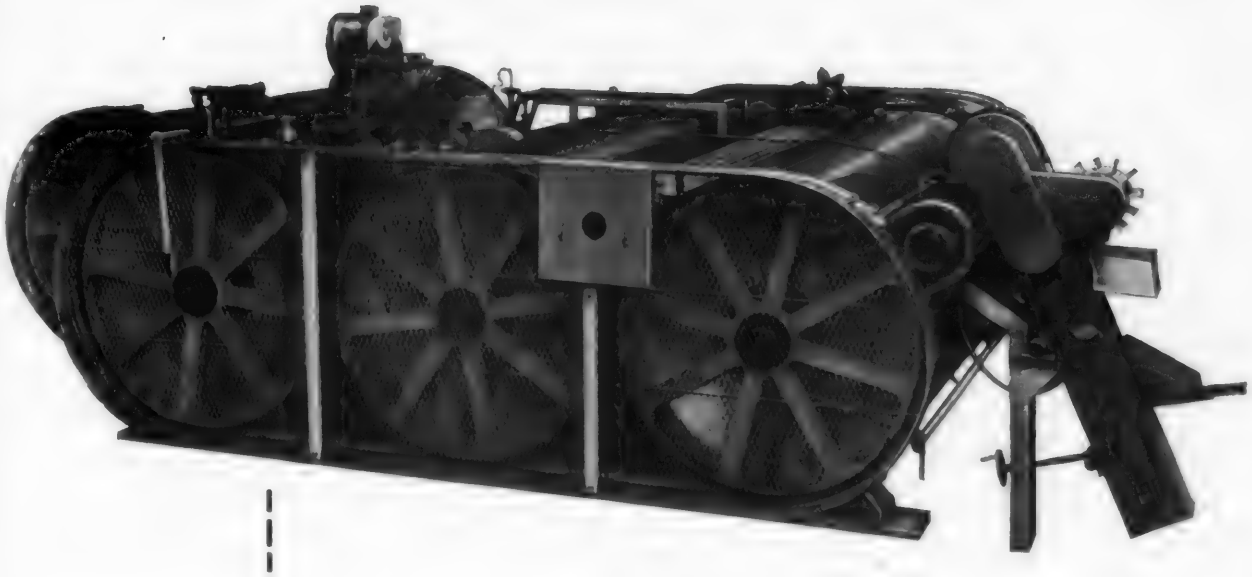
A Natural Product in a form which can be easily and conveniently and economically used by our customers.

We are specialists in this field and for full details of our Range of Natural Colours, write:

WHITE, TOMKINS & COURAGE, LTD

NORTH ALBERT WORKS, REIGATE

Telephone: Reigate 2242/3 *Telegrams:* ESSWHITE, REIGATE



another British engineering triumph . .

The Mather & Platt

Rotary Sterilizer

The machine illustrated above was recently installed in a well-known British cannery, and has an output of 400 cans per minute at an approximate cooking time of 19 minutes.

Mather and Platt Ltd can offer a complete range of continuous cookers, including the following:

PRESSURE COOKERS

- Agitating Rotary Sterilizers.
- Non-Agitating M. & P. Cookers.
- Hydrostatic Cookers.

ATMOSPHERIC COOKERS

- Agitating Round Shell Cookers.
- Agitating Square Tank Cookers.
- Non-Agitating M. & P. Cookers.
- Hydrostatic Cookers.

507

Mather & Platt Ltd.

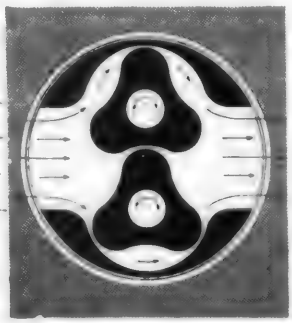
RADCLIFFE, MANCHESTER

London Office: PARK HOUSE, 22 GREAT SMITH STREET, LONDON, S.W.1

Perfection

in Pump performance

Long, steady, reliable performance under the hardest working conditions is what you get with the Howard M-Type Rotary Pump. It's strong and powerful in dealing with thick and viscous liquids, yet its superior streamline action also enables it to handle even the most delicate liquids without the slightest degree of agitation. The M-Type Rotary Pump is ideal for industries handling liquid foodstuffs and chemicals, no matter how high or low their viscosity. Its all stainless steel construction and foolproof design eliminates any possibility of corrosion or contamination. Maintenance and cleaning are very simple matters and the pump casing can be jacketed for heating purposes.



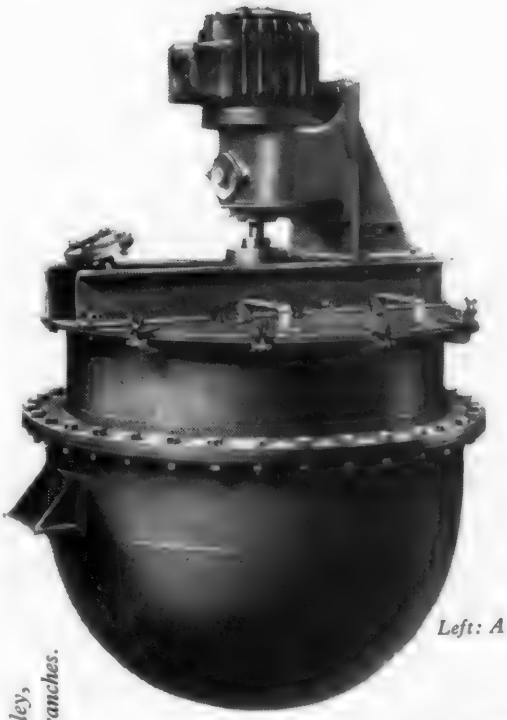
Howard

PNEUMATIC ENGINEERING CO. LTD.

There are 7 sizes of Howard M-Type Rotary Pump for duties from 150 to 20,000 gallons per hour, for heads up to 200 ft.
Please write for our very informative and well illustrated brochure.

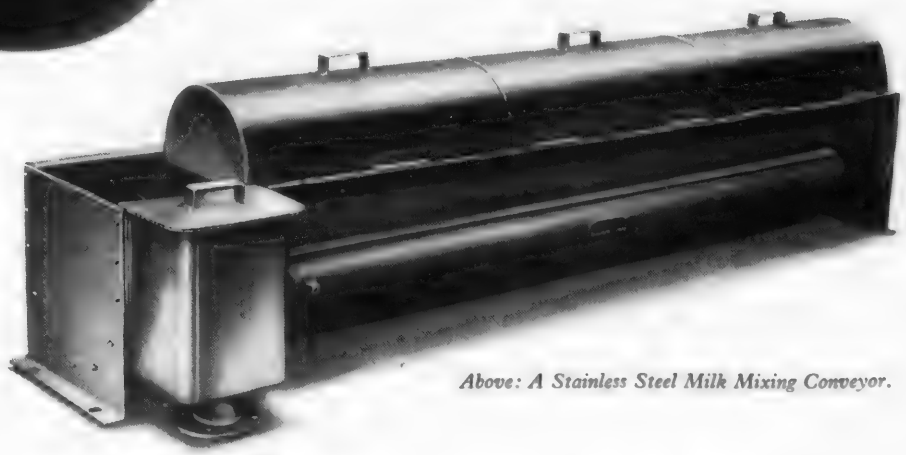
HOWARD PNEUMATIC ENGINEERING COMPANY LIMITED

FORT ROAD, EASTBOURNE, SUSSEX *Telephone:* EASTBOURNE 1179 *Telegrams & Cables:* HOWMATIC



Commended for INaction

Left: A Stainless Steel Jacketed Mixing Vessel.



Above: A Stainless Steel Milk Mixing Conveyor.

W. P. Butterfield Ltd., P.O. Box 38, Shipley, Yorks. Tel.: 52244 (8 lines). London & branches.

Butterfield
STAINLESS STEEL EQUIPMENT

. . . FOR THE MODERN DAIRY

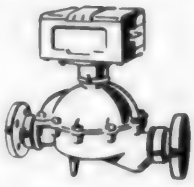
Neither in processing nor transport must any harmful influence be able to "get at" Food supplies; strict consideration of hygiene demands Stainless Steel as the ideal container for storage, processing and bulk delivery. Its hard polished sterility ensures no action whatsoever by contents on containing surface or vice versa. Butterfield Stainless Steel Equipment has the fine workmanship and flawless finish necessary for food handling. Tanks, Vats, Vacuum and Pressure Vessels, Tilting Pans, Jacketed Pans, Troughs, Trolleys, etc., are fabricated to your Plant Engineer's specification.

Also Stainless Steel Road Tanks for Milk, Fruit Juices, Edible Oils, Glucose, etc.

Liquid process control by **MEASUREMENT**

1½" S 7. stainless steel meter with screw on flanges and 12" vertical index.

When you require to measure bulk or batch quantities of edible liquids, oils, spirits and solvents, hot or cold water, we can supply meters with summating, resettable, electrical presettable, direct reading or pointer type index attachments (as illustrated) and control equipment.



BOX TYPE COUNTER

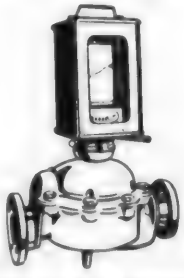
Re-settable batch-dispensing counter with 7-digit cumulative total register.

VERTICAL RE-SETTING INDEX

Can also be used to pre-set a determined quantity, with electric trip to operate solenoids pumps, warnings, etc.

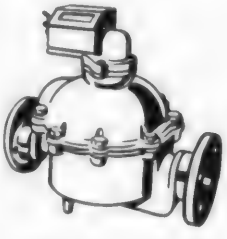
ZEROSET INDEX

Simple turning motion re-sets indicator to zero



MECHANICAL RECORDER

Gives a graphic record on 5" x 12" chart; suitable for 4 hour, 8 hour, 1 day, 7 day periods



PREDEX CONTROLLER

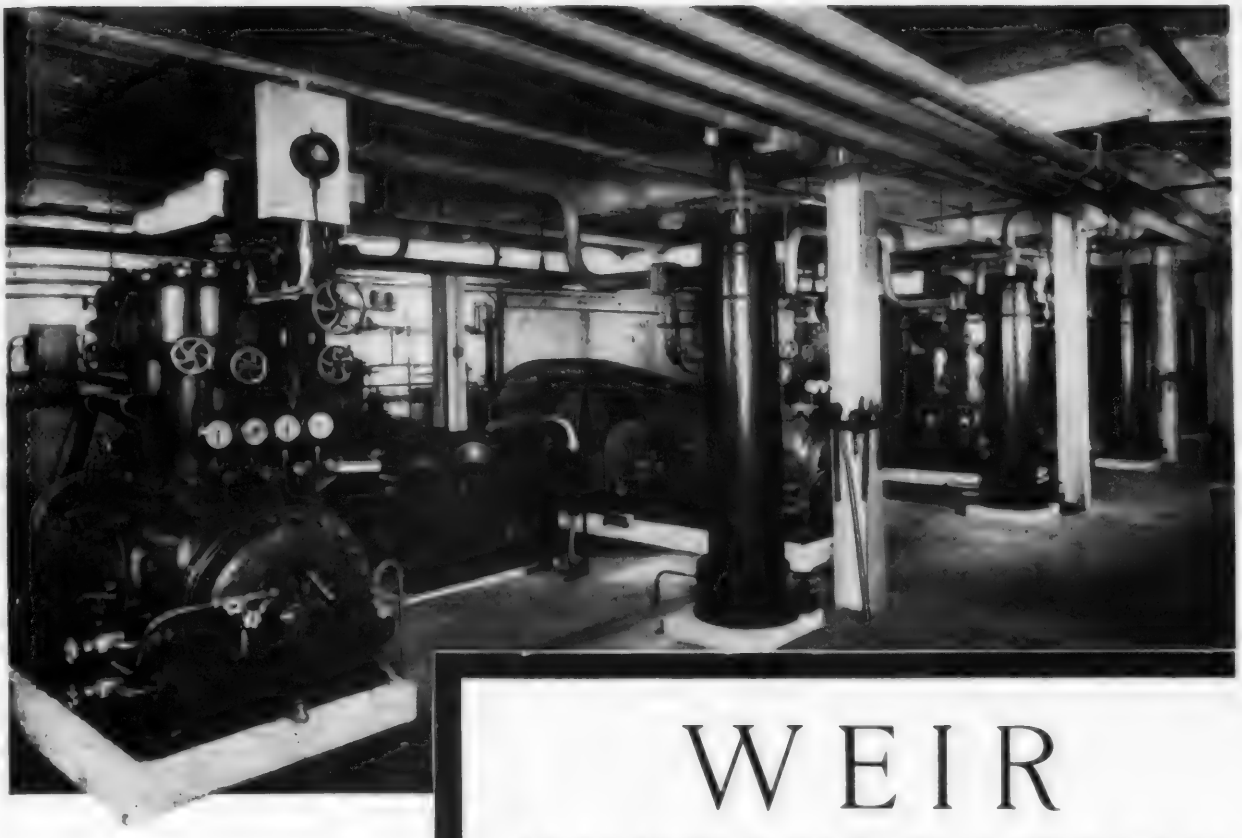
Automatic means for continuous dispensing of fixed quantities of liquids.

MEASUREMENT

INDUSTRIAL **LIQUID** *METERS*

(A COMPANY OF THE PARKINSON & COWAN GROUP)

MEASUREMENT LTD. HYDRAULICS DIVISION
119 Union Street, Oldham, Lancs. Telephone: Main 6432.
LONDON: TERMINAL HOUSE, Grosvenor Gardens, London, S.W.1.
Telephone: SLOane: 0111.



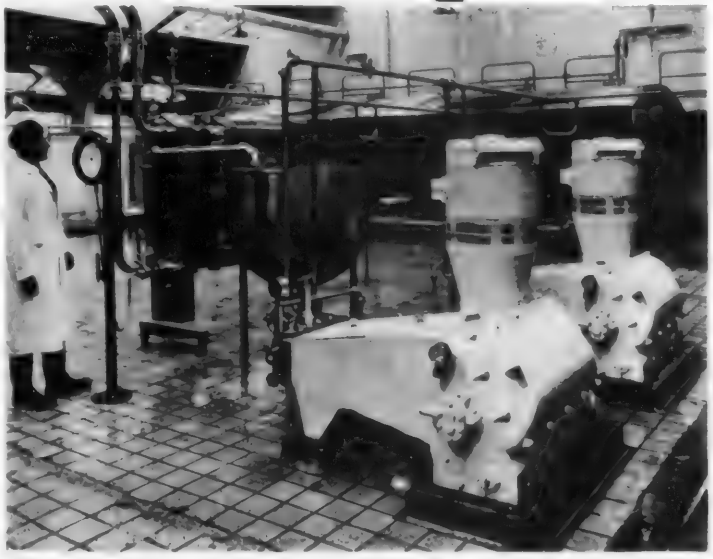
WEIR

REFRIGERATING MACHINERY

We welcome consultation on all questions of refrigeration and homogenisation.

is available for industrial and marine applications including the dairy and ice cream industries; fishing; brewing; abattoirs and cold storage; cellar cooling; air conditioning and air dehumidifying; ships' stores, etc. Weir Homogenisers for dairy and food industries are made in standard sizes and capacities covering a range of from 10 to 1,250 gall/hr.

Write for Refrigeration folder No. ID. 136 and Homogeniser booklet No. ID. 123



G. & J. WEIR LTD.
CATHCART : GLASGOW :

MADE BY THE MAKERS OF WEIR PUMPS

GREAT-GRANDFATHER SPEAKS HIS MIND

"If you want quicker boiling, m'boy, here's a way to get it"

Be superior if you like about the "Great-Grandfather influence" in industry; in his own day, you may recall, the old gent fairly made things hum.

PROCEEDING, GREAT-GRANDFATHER SAID:

"Here's your answer, m'boy: it's all in this book, plain as a pikestaff. Worth a guinea a page, b'gad!

"If you want quicker boiling, more even boiling, the first thing to do, it says, is to give the pans dry steam, instead of a mixture of steam and water. The suggestion is to dry the steam just before it gets to the pans. And this picture shows you how to do it.

"The second thing, it says, is to see that the condensing surfaces of the pans are not cluttered with air and water. That's so as to give a quick passage to the heat from the steam to the stuff in the pans.

"And look at these two pictures, m'boy. This one shows your pans as they are now, and this other shows the simple things to be done to give you faster warming up, a better boil and quicker processing.

"Well, now: here it is—on paper. The next thing, m'boy, is to try it and see. The first hour should tell you whether these Spirax people are right or wrong."

SPIRAX-SARCO STEAM CONTROL

SPIRAX-SARCO LTD., CHELTENHAM, Glos. *Phone: Cheltenham 5175-6. Grams: Spirax, Cheltenham.*

LONDON OFFICE: 28 Victoria Street, S.W.1. *Abbey* 6101-3832

---------- *REQUEST SLIP FOR FURTHER INFORMATION* ----------

To SPIRAX-SARCO LTD., CHELTENHAM, Glos.

*Please send Bulletin "*STEAM FOR PROCESS*", and tell us more about getting better output from boiling processes.*

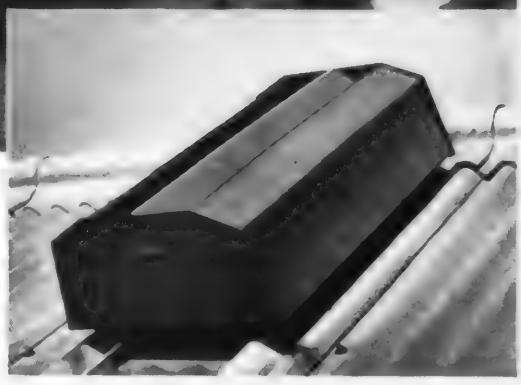
NAME:

ADDRESS:

FM455

Some of the 7,000 COLT users

Ambrosia Ltd.
Batchelors Peas (Southall) Ltd.
Birds Eye Foods (Gt. Yarmouth) Ltd.
Blue Arrow Products Ltd.
Brand & Co.
British Canners Ltd.
British Oil & Cake Mills Ltd.
British Sugar Corporation
Burtons Bakeries
B.W.B. Cakes Ltd.
Cadbury Bros. Ltd.
Callard & Bowser Ltd.
Candycraft Ltd.
Cannon Brewery Co., Ltd.
Carr & Co., Ltd.
Chivers & Sons Ltd.
Coca-Cola Ltd.
Cork Distilleries Ltd.
Cow & Gate Ltd.
William Crawford & Sons Ltd.
Crosse & Blackwell Ltd.
Roderick Dewar Ltd.
Diamints Ltd.
The Distillers Co., Ltd.
Dunhills (Pontefract) Ltd.
Facchinos Biscuits Ltd.



JAMES KEILLER Ltd., Silvertown

J. S. Fry & Sons Ltd.
Fry-Cadbury (Ireland) Ltd.
Glacier Foods Ltd.
Homade Products Ltd.
George W. Horner & Co., Ltd.
Horrocks & Sons (Merthyr & Newport) Ltd.
W. & R. Jacob & Co., Ltd.
Johnson, Mooney & O'Brien Ltd.
James Keiller & Son Ltd.
I. H. Lavery & Co., Ltd.
Lincolnshire Bacon Factory Ltd.
London Co-operative Society Ltd.
J. Lyons & Co., Ltd.
Wm. MacDonald & Sons (Biscuits) Ltd.
John Mackintosh & Sons Ltd.
Maconochie Bros. Ltd.
Malga Products Ltd.
Mann, Crossman & Paulin Ltd.
Merseyside Food Products Ltd.
Midland Bacon Factory Ltd.
Milk Marketing Board
The Nestle Co., Ltd.
Oxo Ltd.
S. Parkinson & Son (Doncaster) Ltd.
Parsons & Co., Ltd.
James Pascall & Co., Ltd.
Pearce Duff & Co., Ltd.
Scribbans-Kemp Ltd.
Senior Bros. Ltd.
Serpells Ltd.
S.P.D. Ltd.
Standard Bakery Co., Ltd.
Tate & Lyle Ltd.
Tennant Bros. Ltd.
Tip Top Bakeries
United Dairies Ltd.
Vine Products Ltd.
T. Wall & Sons Ltd.
The Waltham Confectionary Co., Ltd.
Western Margarine Co., Ltd.
Whites Sugar Mills Ltd.
Yeatman & Co., Ltd.

***one of over 7,000 major industrial organisations with natural ventilation planned by* COLT**

In designing the new factory for James Keiller Ltd., at Silvertown, the Chief Architect at Crosse & Blackwell Ltd., the parent company, was anxious to install a system of extract ventilation which was powerful, fully controllable, of robust construction and which would not mar the appearance of the new building. His preference was for natural ventilation equipment which would fulfil all of these requirements without the disadvantages of noise, wear, tear, maintenance or running costs.

The obvious choice was the COLT SRC 2046 Controllable High Duty Roof Extractor Ventilator. The installation of a number of these ventilators has since proved to be an unqualified success.

FREE MANUAL—*with full specifications of the wide range of Colt Ventilators is available on request from Dept. S.23/263*

COLT

THE SPECIALISTS IN PLANNED NATURAL

VENTILATION

COLT VENTILATION LTD · SURBITON · SURREY · TELEPHONE: ELMbridge 6511-5

Also at Birmingham, Bradford, Bridgend (Glam.), Bristol, Dublin, Edinburgh, Liverpool, London, Manchester, Newcastle-upon-Tyne, Sheffield, and Warwick

Cocos Butters and Edible Oils

75 YEARS' experience in manufacturing edible fats for the industries we serve has taught us the need for the widest possible range of "Butters" to meet the varied requirements of our customers. Price considerations, specialised manufacturing needs, suitability for blending at user level, a wide range of melting points, colour and texture, are but a few of the many factors that have been taken into consideration.

The only standard factors which hallmark *every* Loders' "Butter" irrespective of its specialised nature are :—

Unvarying quality and consequent consistency from one batch to another.

A notably bland flavour.

Exceptionally smooth texture giving fine mixing qualities.

Excellent keeping qualities.

***Why not write to us for a copy of our brochure ?**

LODERS & NUCOLINE LTD.

Southern Area:
UNILEVER HOUSE · BLACKFRIARS
LONDON · E.C.4 · Tel: CENTRAL 6323

Northern Area:
LIVERPOOL ROAD · WARRINGTON
LANCS. · Tel: WARRINGTON 800

Scotland:
19 BLYTHSWOOD SQUARE · GLASGOW
Tel: GLASGOW CENTRAL 8921

LN 5 · 5 · 130

FOOD MANUFACTURE

Vol. XXX. No. 4 · Published Monthly · April 1, 1955

CONTENTS

	Page
Editorial	135
A New Process for Continuous Bulk Sterilisation and High Temperature Filling of Low Acid Foods *By Horace L. Smith Jr. & C. Olin Ball*	139
Progress in 1954:	
The Ice Cream Industry *By E. Humphriss, A.R.I.C., M.I.Biol.*	144
The Vitamins—2. *By F. A. Robinson, M.Sc. Tech., Ll.B., F.R.I.C.*	147
Preserved Foods for the Swedish Larder—1. Canning & Preserves Manufacture *By C. H. Sporle*	151
Concentrated Vanillas—How They are Made, How to use Them *By James J. Broderick*	155
Food Oil Supplies Greater than Ever	158
Preventive Maintenance of Canning Plant *By D. A. Browne*	159
Compound Milling	160
Fruit: World Trade at Record Level	161
Advances in Food Technology	162
Machinery and Equipment	164
News Digest	166
Food Packaging	171
Food News Overseas	172
Trade Marks and New Companies	174
Information and Advice	175
Recent Patents	176

Published by Leonard Hill Limited, Stratford House, 9, Eden Street, N.W.1. Euston 5911

Subscription Rates: 1 year $8; 3 years $20; payable in advance.

It's the temperature in the middle that matters

This is only one of many examples where Foster temperature measuring instruments aid safe and rapid food manufacture. In batch processing curing times are reduced to the absolute minimum with Foster Needle Thermo-couples and special patterns have been developed for this and many other processes. But wherever the measurement of temperature is required Foster individually built instruments can be relied upon to give long and trouble free service. Write to us for further information on this or any other temperature measurement problem. We shall be happy to advise you.

HISTORICAL NOTE

The Needle Thermo-couple was originally developed by this company on behalf of the British Food Manufacturing Industries' Research Association for investigating heat penetration of canned foods in an autoclave.

RESILIA FOSTER INSTRUMENTS

for indicating, recording and controlling temperature

FOSTER INSTRUMENT CO LTD LETCHWORTH HERTS ENGLAND

Telephone Letchworth 984-5-6 Telegrams Resilia Letchworth

for FOOD STORAGE AND TRANSPORT

THIS USEFUL FOLDER (66R)

BRITISH INSTRUMENT INDUSTRIES EXHIBITION
EARLS COURT LONDON
June 28 - July 9 1955

contains details of several instruments for measuring TEMPERATURE in Food Stores, and GAS ANALYSERS for the gas storage, on land or on board ship, including:

ELECTRICAL THERMOMETERS • DIAL THERMOMETERS
MERCURY-IN-STEEL THERMOMETERS (Indicating and Recording)
CO_2 & OXYGEN RECORDERS & INDICATORS

A table giving the most effective storage condition for various food products is reproduced. May we send you a copy?

CAMBRIDGE INSTRUMENT COMPANY LIMITED
13 GROSVENOR PLACE LONDON SW1

FOOD MANUFACTURE

Vol. XXX, No. 4 April 1, 1955

New bread cooling plant

WHY do bakeries in general make less use of air-conditioning than do many other industries?

Two answers to that question were apparent in the course of a survey, before the Society of Chemical Industry in Manchester recently, of "Air-conditioning in the Baking Industries." The speaker, Mr. E. A. Farrand, B.SC., A.R.I.C., of Inglis and Co., Ltd., Belfast, said it was not easy to justify the capital cost of air-conditioning plant, and some current equipment, he considered, was unnecessarily cumbersome, and was not perfectly adapted to the requirements of bread cooling, where air-conditioning could render best service to the baker.

Mr. Farrand disclosed that there had now been designed a new plant for bread cooling which overcame most of the disabilities of its predecessors. The design was produced by air-conditioning engineers collaborating with makers of bakery machinery, using data provided by practical studies for his own firm. For more than $2\frac{1}{2}$ years he had himself been studying bread cooling and investigating the performance of air-conditioned cooling plants in various parts of the country. He had been able to test his conclusions with a pilot air-conditioned cooling plant with a capacity of about 1,000 loaves, and the test results had now been translated to mass production scale, to handle about 10,000 loaves.

In this, the humidification plant had been made sufficiently compact, using powerful centrifugal atomisers, to be installed in the air-flow ducts. It had thus been possible to divide the cooling chamber into five zones, in each of which there was automatic control of temperature and humidity.

A fundamental difference between this and existing plants was in the direction of the air-flow, which generally was from the delivery end to the feed end—in the horizontal plane. In the new design conditioned air moved vertically, from bottom to top, and the bread conveyor moved in the same direction during the course of its travel through the cooler. The result had been a flexible plant in which technical data on cooling could be practically applied, and which could be set to give the best results automatically according to the type of bread and type of cooling required.

Mr. Farrand, earlier, had made clear his belief that the future lay in further mechanised production of biscuits, bread and flour confectionery, and it was here that air-conditioning could confer production efficiency and uniformity of quality. He suggested, however, that in a number of stages of the baking process intelligent use of ventilation and of oven heat, possibly supplemented by space heaters, would provide perfectly adequate conditions.

Corrosion losses in food factories

AN unusual but important aspect of food—its corrosiveness towards plant, equipment and packs—is discussed in an article in the March issue of our associated journal, *Corrosion Technology*. The author, Mr. J. W. Selby of the British Food Manufacturing Industries Research Assoc., considers corrosion such an important problem in the food industry that he hopes that eventually the National College of Food Technology will include the principles of corrosion prevention and plant design in its curriculum.

From the viewpoint of the corrosion scientist, foods are rather complex combinations whose exact corrosion characteristics are not easy to predict except after long and careful experiments with different metals under actual factory conditions. Broadly, however, foods fall into four groups from the corrosion aspect: the *acid-chloride* group, which includes pickles and sauces; the *acid group*, which includes most fruit products; the *neutral chloride group*, which includes many meat and fish products such as bacon, ham, meat and fish paste; and a *neutral and relatively inert group*, which includes fats and various cereal products.

The choice of metals for food plant and equipment is by no means simple and requires considerable knowledge of the nature of the foods to be handled. Unfortunately food chemists rarely have much knowledge of metallurgy or corrosion technology, so that the responsibility falls heavily on the equipment makers. Even when the correct metal is used for a piece of equipment, the habit of food manufacturers, particularly smaller ones, of using equipment for general purposes may lead to unexpected corrosion. An example of this quoted by Mr.

Selby concerns fruit juices. These were heated in copper vessels from which they picked up an appreciable amount of copper, and were then passed through an aluminium plate filter. Copper was deposited on the aluminium plates, which began to corrode rapidly through the action of the acid juice on the copper-aluminium couple so formed. One of the elementary principles of corrosion is that because aluminium has a strongly negative electrode potential, it is liable to corrode severely if brought into metallic contact with copper, iron or other more positive metals in the presence of an electrolyte. The accident described demonstrated this principle perfectly, but the manufacturer concerned bought his knowledge at the price of a new filter.

Stainless steels are in many respects admirable metals for food plant. Their corrosion resistance is due to the presence of a protective oxide film on the surface. If this breaks down, however, perforation of the vessel can occur accompanied by only a negligible contamination of the product. It is this risk, coupled with the relatively poor heat transfer coefficient of stainless steels and their high cost, that sometimes discourages food manufacturers from using them.

The uses and limitations for food plant of several other metals—aluminium, copper, tin, nickel, etc.—are discussed lucidly by Mr. Selby, and he also touches on plastics, glass, rubber and ceramics. Finally he deals with the corrosion of structural steel in food factories and points out the problems attending the use of lead paint.

No food manufacturer can read this article without thinking afresh about the often neglected question of corrosion. Apart from its destructive effect on plant and buildings, corrosion can also raise the dreaded risk of contamination of products. Clearly there is need for closer co-operation on the question between food manufacturers, plant designers and fabricators, makers of constructional materials and architects. Meanwhile there is little real excuse for failing to obtain expert advice from such sources as the D.S.I.R. and its Food Investigation Organisation, and the research associations of industry.

Refrigeration of cake batters

CONTINUING its investigations into the application of refrigeration as a useful tool in the bakery, the British Baking Industries Research Association has investigated the storing of best and medium quality cake batters in the ordinary domestic refrigerator at a temperature of 38-40°F. Subject to the precautions mentioned in their recently published Bulletin, it has been found that such batters could be stored for periods of up to four days, either in bulk or in suitable individual containers. Photographs published by the Association reveal that the retarded batter produced a cake of equivalent commercial qualities to the controls.

Puff pastry prepared from normal recipes could be stored in a refrigerator for a period of three to four days. No skimming of the dough took place when the humidity of the cabinet was suitably controlled.

Blocked out tart and custard shapes stored in a refrigerator with a suitably controlled humidity showed that there was less drying of the paste, and consequently less shrinkage on baking, than when stored in the open bakery. It was found possible to store these blocked out pieces in the refrigerator for two to three days.

Unbaked short-paste could be stored for two to three days if wrapped in grease-proof paper.

Beer for bluejackets

CHEERS rose in the House of Commons when the Civil Lord of the Admiralty announced that it had been decided to relax the restriction on the issue of beer. The difficulty of supplying beer in ships, he explained, was one of storage. It was calculated that enough to provide a pint a man for 28 days in H.M.S. *Indomitable*, if stored in 5-gal. drums, would weigh 43·6 tons. However, in spite of this the Admiralty had decided on the relaxation mentioned, although this did not guarantee a regular issue.

In the modern Navy, two tendencies conflict with one another. On the one hand there is the desire to improve conditions for sailors at sea by giving them more living space and more amenities such as beer, and on the other there is a constant encroachment upon available space by an ever-increasing mass of equipment to cope with such weapons as submarines, supersonic aircraft and nuclear bombs. The aim, then, is to cut down the space requirements of food and drink. In this connection there will naturally be great interest in the experiments on concentrating beer that the Food Investigation Organisation reported a year or two ago. It will be recalled that concentrated beer had been prepared by freeze-concentration and evaporation under reduced pressure. In each instance it was found possible to retain, or replace when lost, essential characteristics of beer. It was then reported that the tests were to be extended to the pilot plant scale, both to obtain information on bulk handling and to provide sufficient material for storage tests.

Another amenity at sea which is perhaps even more important than beer is plenty of fresh water. A modern battleships needs 350 tons a day, and it is obviously impossible to store such huge quantities. So the fresh water is obtained by distilling salt water. Admiralty chemical engineers have recently made a great improvement in the efficiency and economy of

water distillation by inventing a compound that prevents salt build-up on evaporator surfaces and consequent rapid drop in output. Used on the Royal tour ship *Gothic*, the compound raised evaporator output from 10 to 32 tons/day.

Thus the diverse skills of nutritionists, chemists and engineers are enlisted to serve the Navy, which, come to think of it, has inspired a great deal of scientific achievement, from antiscorbutics onwards.

Orkney oysters

PLANS HAVE been prepared for the revival of the Orkney oyster fishing industry and a start may be made in the spring. At one time Orkney had a fairly flourishing industry shipping to the south, the previous stations being at Firth Bay which prospered over a considerable period and at Deer Sound where there was also a flourishing bed. The proposals for revival have come through Mr. J. Grimond, M.P. for Orkney, who has been in consultation with the Marine Biological Station at Millport.

The station have been interested in this work for some time and have been planting oyster beds along the west coast of Scotland, where the industry has largely died out. It is understood that the proposal has reached the point where definite locations are being considered with a view to some work being done in the spring. The selected beds would be planted with two or three year old oysters, which would be allowed to settle over a minimum of three years to determine whether the industry could survive and flourish. The importance of this work to the area—and to the West Coast—lies in the present considerable demand for shellfish from many of the major markets; lobsters have for some years proved an outstanding source of income for the Western Islands fishermen and successful cultivation of oysters would add yet another valuable source of income.

Sugar refining by ion exchange

HIGHER yields of sugar at lower prices are claimed for a new refining process employing ion-exchange resins to purify the cane juice which has been devised by chemists of the U.S. Department of Agriculture. The process, which is still in the experimental stage, is said to produce a sugar ready for direct consumption which is particularly suitable for confectionery.

The Department explains the new process as follows: "Clarified cane juice is passed through beds of ion-exchange resins (some of which are similar to those employed to remove hardness in water). This operation removes minerals and organic materials from the juice, resulting in increased yields of sugar. It also takes out colouring matter to give a light-coloured product approximating the colour of fully refined sugar. Refined sugar sold in stores has been crystallised at least twice.

"This new reverse-cycle ion-exchange system permits the purification of cane juice without the loss of sugar by inversion (hydrolysis), which occurs when conventional ion-exchange systems are used. The conventional process removes bases first, leading to inversion of sugar in the resulting highly acid juice. The reverse-cycle process eliminates this chemical reaction, and the resulting loss of sugar, by removing the acids first."

Yields of cane sugar obtained in the laboratory by the new process were higher than those of conventional processes, it is claimed. Costs are expected to be about one-half cent per lb. less than refined sugar. Under Louisiana conditions, for example, the increase in yield would amount to about 12 to 15 lb. of sugar per ton of cane of average sucrose content. Similar savings presumably would result with cane from Florida, Puerto Rico, and Hawaii.

Confusion over chemicals

THE well-worn but still highly controversial topic of chemicals in foods was debated again in Parliament last month. In the House of Lords, Lord Douglas of Barloch wanted the Government to place an absolute obligation on food manufacturers who used synthetic flavours and colours to disclose that fact to the consumer. Replying to this suggestion, the Earl of Home, Minister of State, Scottish Office, explained that if the new Food and Drugs Bill became law, the Government proposed to draw up a permitted list of food additives and to control or prohibit other substances by regulation. He added that so far as was reasonable they would require manufacturers to label their products and let the public know what was in them. Lord Douglas' amendment was accordingly withdrawn.

It is indeed difficult to see what additional protection for the consumer would be achieved by Lord Douglas' suggestion, for it implies that the layman has a knowledge of chemistry which he does not possess. Would he be able to decide whether or not sugar was edible if it came in a packet labelled *sucrose*? Would he still eat beef fat if offered *glyceryl stearate*? Would he still be as liberal with vinegar on his fish and chips if it came in a bottle labelled *acetic acid*?

In the public mind there is considerable confusion about the nature of chemicals. There is a tendency to think of them as man-made ("synthetic") substances, all more or less poisonous. The fact that all foods are chemicals is not generally appreciated. Nor is it generally realised that Nature makes chemicals, some of them poisonous and some of them in

foods. Popular education on these basic facts of food chemistry is to be welcomed, and we were pleased to see a short article explaining the above points in a recent issue of *Family Doctor*, the monthly health magazine published by the British Medical Association.

In this article it is pointed out that the processing of foods has been an inevitable accompaniment of human development. Man found that "chemicals like sodium chloride—common salt—could improve the flavour, and could help preserve the food. Then he started smoking his foods to tide him over the lean season. There are few foods more highly charged with chemicals than what we call a 'naturally smoked kipper.'"

The article concludes by emphasising that most substances added to foods or used to create synthetic foods are "well and truly tried out, and scientists are as certain as they can be that they are doing no harm. The danger lies, of course, in using chemicals in food before being reasonably certain that they are not going to be bad for us. Nobody can ever be absolutely sure that a substance is entirely harmless; even common salt can be dangerous if we get too much."

It is this kind of sane approach to the subject of chemicals and food that can do much to allay public misgivings.

Hygiene in pressed meat manufacture

Two years ago Dr. A. I. Ross, deputy medical officer of health, Leicester, discussed with us his idea for forceps for use in the preparation of pressed meat. He now informs us that the forceps have been put into production by Alfred Cox (Surgical), Ltd., of Coulsdon, Surrey.

Dr. Ross's idea arose from the report of the Manufactured Meat Products Working Party which recommended final cooking by steam as the best method of preventing contamination of pressed meat products. Unfortunately the equipment required is too expensive for the small producer. Accordingly, Dr. Ross devised an aseptic technique whereby after cooking in the usual way the meat is placed in presses using sterile instruments and without touching by hand. This technique has been improved with the use of the new forceps, which some Leicester butchers have found useful for holding pieces of cooked meat, removing bones and sinews and placing meat in presses.

The forceps are robust, 12 in. in length, and have a central projection from one blade on which the other blade slides to prevent the gripping surface of the blade slipping sideways. The blade ends are intentionally square and not pointed to allow them to be used for packing meat tightly.

Before each batch of cooked meat is to be placed in the presses, the forceps, together with the knives and forks used for trimming the meat, are boiled for 10 min. and then placed in a bucket or jug which has also been boiled. Sufficient hypochlorite solution of a strength of 100 p.p.m. of chlorine is added to the bucket to cover the blades of the instruments, leaving the handles projecting. After use, each instrument is returned to the hypochlorite solution, thus avoiding the contamination of the blades that would arise if they were placed on the work bench.

The forceps are described and illustrated in *The Medical Officer*, February 25, 1955.

Waves in the cookhouse

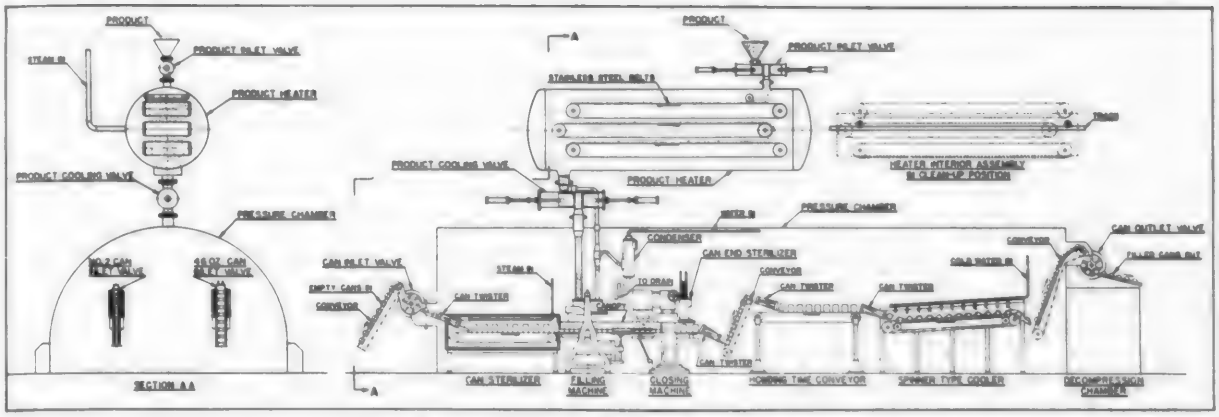
ULTRA-VIOLET, infra-red, ultrasonic and even radar waves have all been called to battle on the kitchen front, according to press reports on "all this newe science that men lerne." Infra-red waves or rays were to be expected in cooking, the modern version of heating being to use as source an internal combustion gas-burner. Some time ago at the Building Centre in London, there was demonstrated an infra-red griller cooking 200 steaks an hour.

Meanwhile the Raytheon Manufacturing Co. of Massachusetts is turning out the first radar cooking-ranges, the swiftest cookers known, and some are already installed in New York hotels. Micro-waves from a high-frequency tube cope rapidly with anything to be cooked from gingerbread to hamburgers and roast potatoes—all done to a turn when the "frequency breakdown" of the food is reached. A New York café, armed with a radar range, finds it takes longer to wrap a hamburger than to cook it, the cooking being done in the wrapper which remains unaffected. On the home front we hear of "electronic bread" baked in 4 min. by high frequency rays.

Ultra-violet waves also aid the cook in her daily round. U.V. waves will detect at once whether eggs are really new-laid; a fresh egg gives a rose-tinted glow, while an ancient one displays a tell-tale blue. With the same radiation test Gorgonzola and Roquefort will react differently from old stock cheeses.

After the meal is over it is the turn of ultrasonics. The modern kitchen can have an ultrasonic vibrator to simplify washing-up by shaking off scraps congealed on plates and by terminating the unholy union between porridge residues and the interstices of the pan. Since ultrasonics are also able to sterilise, their possibilities seem boundless.

Finally, with the meal cooked and the washing-up done, are there no beneficial waves to aid digestion? The answer seems to be "Yes," for according to a Dr. Henri Thuilier of Paris, the best remedy for chronic indigestion is the sound emanating at very audible wavelength from a brass quartet!



Flow diagram of the Smith-Ball canning process.

A New Process for Continuous Bulk Sterilisation and High Temperature Filling of Low Acid Foods

By Horace L. Smith, Jr., and C. Olin Ball

Sterilisation of low acid foods—milk, meat, fish, vegetables, etc.—requires higher temperatures than are necessary for acid foods. Several methods have been devised with the object of eliminating the conventional high-pressure, high-temperature steam retort batch method for sterilising low acid foods. Now a new approach to the problem has been made by the authors. Their process, the Smith-Ball process, permits the filling and closing of containers at whatever temperature is optimum for the product being processed. Basically it consists in placing all equipment within a chamber in which the air pressure is adjusted to prevent water from boiling until it reaches 250°F. or more. In the following article the inventors describe their process, the equipment, and its performance under commercial conditions.

THE basic principle of Nicolas Appert's invention for heat sterilisation of food in sealed containers, which consisted of raising the temperature of the product to some predetermined value and holding it at this temperature for sufficient time to destroy all pathogenic and spoilage organisms, has not changed through the years. Other ways of securing sterilisation may be developed that will render obsolete the old fashioned time-temperature method now universally used in the can and glass packed food industry, but this article is a description of a process designed to secure sterilisation by the time-temperature principle with much less damage to the product, compared to the conventional retort procedure.

Sterilisation of acid foods has been a comparatively easy process because the products could be heated to sterilisation temperature before filling, and the containers filled and closed at a temperature below 212°F., but high enough to ensure complete sterilisation not only of the product, but also the container and cover. Sterilisation of low acid foods, which includes milk, meat, fish and vegetable products, is much more difficult owing to the higher temperatures required in order to secure sterilisation. It is not the purpose of this article to discuss the merits and defects of the many methods designed to eliminate the conventional high-pressure high-temperature steam retort batch method, but to describe a new and at least different approach to the problem.

In setting forth the ideal process for sterilisation of low acid foods, it is believed that most food technologists would agree on the following specifications:

1. High temperature, short time processing is desirable, rather than lower temperature and a correspondingly much longer time to produce the same F value.
2. Processing time is to be constant, regardless of size of container.
3. Standard canning plant procedure is to be followed as far as possible, including use of regular filling and closing machines.
4. Product should be filled and closed at lethal temperatures, as extra insurance of sterility.
5. The process should be equally applicable to liquid, semi-liquid and non-flowable or solid materials.

The invisible barrier that separates the rather simple and easy pro-

cedure for processing acid foods from the much more involved and difficult processing of low acid foods is the temperature at which water boils at atmospheric pressure, being 212°F. at sea level. If water could be heated to a higher temperature (250 to 260°F.) in open containers the processing of low acid foods would be relatively simple because the product could be heated to sterilisation temperature before filling and the container could be filled and closed at this temperature.

The Smith-Ball process

The Smith-Ball pressure processing method is designed to fulfil the specification previously outlined. The process is designed on principles of physics so elementary and simple that only a brief explanation is necessary. It is well known that the temperature at which water boils is a function of the pressure over the water. The usually accepted value of 212°F. as the boiling point of water at atmospheric pressure simply means that we live under conditions of atmospheric pressure that intersect the vapour-pressure curve of water at 212°F. If for some reason the mass of air surrounding the surface of the earth increased to double the present mass, the pressure at the earth's surface would increase from approximately 15 lb./sq. in. to 30 lb./sq. in. and we would then find that water would not boil until it reached 250°F. The Smith-Ball process consists of a room or chamber of sufficient size to house equipment and personnel, designed to withstand the internal pressure, and operated under pressure conditions that permit filling and closing containers at whatever temperature is selected as optimum for the product being processed.

The first commercial installation was made for processing canned chop suey and other Chinese speciality items.

That installation was planned to include two parallel lines, one for No. 2 cans and one for 46 oz. cans. Each line consists of the following equipment within the pressure chamber:

(A) *Empty container inlet valve.*—This is a rotary pocket type valve used to continuously pass empty cans through the wall of the pressure chamber into the pressurised space.

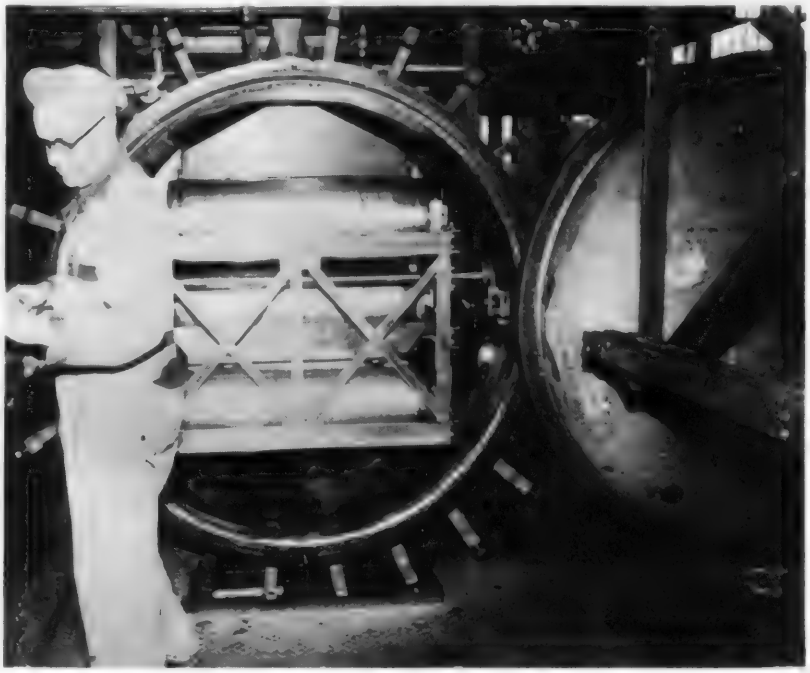
(B) *Can steriliser.*—This device is an enclosure through which the empty cans are moved, the enclosure being kept continuously filled with live steam. The cans are in a vertical position, open end up. The temperature of the steam atmosphere corresponds to the absolute pressure existing in the pressure chamber. If the pressure is 20 lb. gauge, the temperature is 260°F. The pre-sterilised cans pass immediately to the filler.

(C) *Filler.*—The filler is the conventional type as previously used for the product being processed.

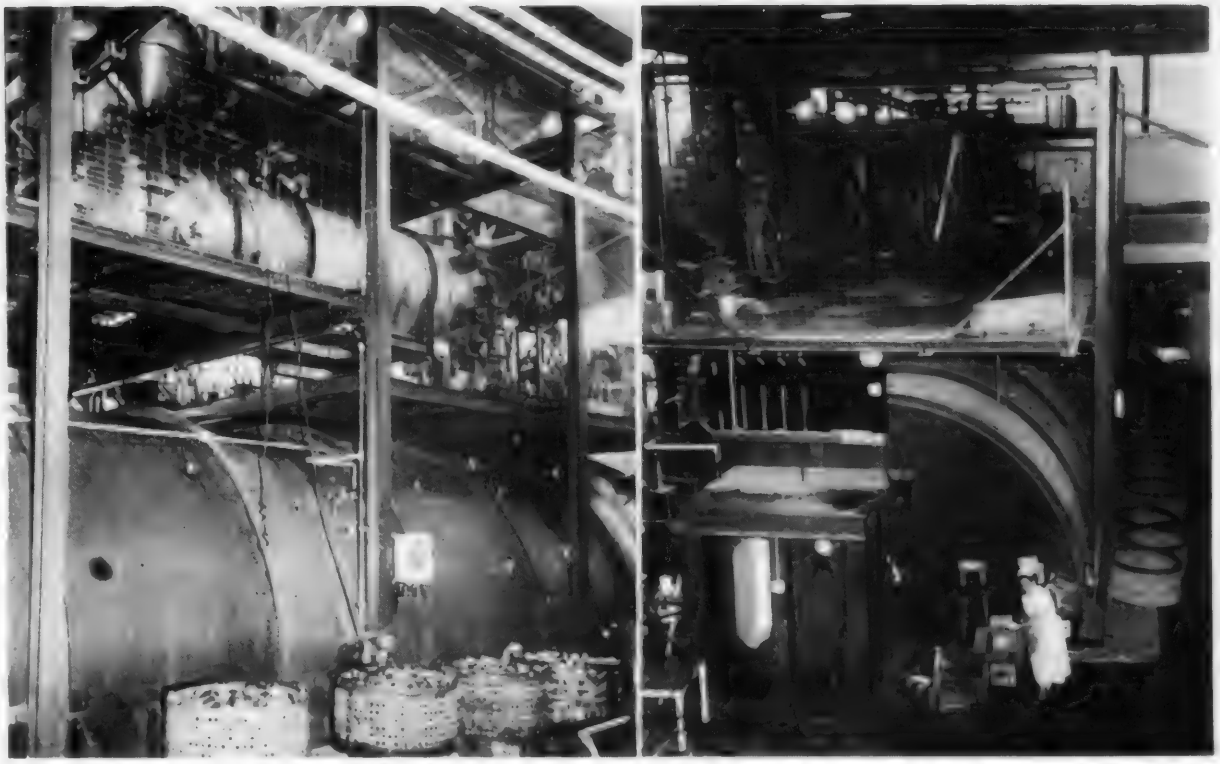
(D) *Closing machine.*—The closing machine is the same as used for conventional processing with the exception that an attachment is added to pre-sterilise the ends before they are positioned on the cans. This device consists of an enclosure surrounding the stack of ends, fitted with coarse thread screws to space the ends slightly and admit steam to all surfaces. The can end steriliser and empty can steriliser provide approximately 6 min. exposure to the surrounding steam.

(E) *Can cooler.*—After the cans are filled and closed they are inverted by means of a can twister and a short time delay is introduced before cooling. The cans may be partially cooled within the pressure chamber in order to reduce internal pressure within the containers and then passed out of the chamber, by means of a rotary valve, to be finish cooled on the outside. If the containers are of small diameter and the filling temperature is not too high, it is possible to omit the pre-cooling within the pressure chamber.

(F) *Air conditioning.*—Within the pressure chamber is located an air conditioning system to maintain the air at optimum comfort conditions. A duct system, provided with hoods and well-designed inlets, draws off all steam and vapours from all locations where steam could escape. These points are: empty can steriliser, filler bowl, can end steriliser, and precooler. A blower continuously



Feed end view of product heater with cover removed, showing interior mechanism of stainless steel belts on pulleys.



Left: **Cylindrical product heater with feed hopper and valve mounted on top of the Quonset shaped pressure canning room.**
Right: **The decompression chamber at the near end of the pressure shell and the product heater on the balcony above the shell.**

draws a large volume of air through the hoods and connections, then through a cold water spray chamber to condense any steam or water vapour, then through a re-heat coil to raise the temperature and reduce the relative humidity to proper comfort conditions.

The air conditioning system not only provides pleasant and healthful working conditions, but is also an added safety feature. If for any reason, a large volume of steam or water vapour were suddenly released within the chamber, the air conditioning system would instantly condense the steam so that no hazard or discomfort would occur to the operator.

Pressure chamber

The pressure chamber consists of a steel room 16 ft. wide, 40 ft. long, 10 ft. high. The floor is $\frac{1}{2}$ in. steel plate, supported and reinforced by "I" beams spaced on 2 ft. centres. The roof is approximately semi-circular in cross section, similar to a Quonset Hut. The shell is $\frac{5}{16}$ in. thick. The ends are vertical, being reinforced with heavy "I" beams. One half of one end is removable for ease in placing or removing equipment. At one end an air lock or entrance vestibule is provided so that operators may enter or leave the main room without causing change of air pressure therein. Adequate floor drains are provided, being connected to a pressure tight sump arranged to discharge waste water continuously without venting air.

Operating pressure

The pressure within the chamber will vary according to the nature of the product being processed, but will usually vary between 15 and 20 lb. gauge. The pressure is maintained by means of a water-sealed rotary air compressor supplying 140 C.F.M. of free air. This volume is ample for ventilation needs of at least seven people, although only one operator is required. Only sterile air is admitted, owing to the method used of washing the air during compression, then passing it through a sterilising filter. This treatment is designed to remove all micro-organisms from the air.

Sanitation principles employed

While the air which is supplied to the pressure chamber is presumed to be sterile, there is always the possibility that a viable micro-organic spore will find its way into the atmosphere of the pressure room occasionally, possibly being released from the person of the operator, or from any other source. The process does not rely on aseptic filling. It does, however, provide assurance that any micro-organic contamination of food, when filled, will be extremely light, that is, of the order of a single spore at infrequent intervals; in other words, only an occasional can will contain a viable micro-organism which gains entrance at the filling point. Even though such contamination may consist of spores of a nominally heat-resistant type, it presents no problem because a comparatively light process destroys such spores when present in very low numbers. Therefore, a short holding

time at the filling temperature of the food destroys any contamination which occurs during filling, as well as the comparatively small portion of the spores originally present in the food and cans, which is not destroyed by heat before the filling operation. Following the sealing of the cans, the next step is to hold the cans for sufficient time to complete their sterilisation; the cans are then conveyed to a spinner type cooler.

Thermal process

It is a well-established fact in the sterilisation of food by heat that it is far less detrimental to the product to select a condition of very high temperature for a very short time than to process at a lower temperature for the much longer time required to secure an equal sterilisation value.

During the past ten years much work has been done on the investigation of the rate of destruction of spores correlated to the original concentration of spores. A very simple statement summarising the results of this work is that when the concentration of spores is high, it is necessary to use a more severe heat processing than is required if the number of spoilage organisms is lower. This would indicate that it is desirable to eliminate every possible source of contamination in order to reduce the severity of the process. The Smith-Ball process, although not designed as an aseptic filling operation, does provide the opportunity for completely sterilising the entire interior of the processing chamber, including all equipment contained therein. At the end of a day's operation the entire chamber can be filled with live steam and actually heated to 250°F. This means that not only all of the equipment, but all interior walls, floors, etc., are completely sterilised each day. Electric wiring is in vapour proof fittings and all mechanical power is transmitted by shafts passing through the walls of the chamber, driven by motors located on the outside. The air provided for ventilation purposes is mechanically sterilised before being introduced into the chamber, furthermore, a steam atmosphere is maintained in contact with the food from the time it enters the filler hopper until the containers receive their covers. Thus, opportunity for contamination of the product by spoilage organisms during the filling operation is reduced to a minimum, and the filling temperature is high enough to destroy any organisms that may enter the container during filling.

Cooling, head space, vacuum

It is important to remember that with the Smith-Ball process all products are more or less completely deaerated at the time of filling, especially those products that are flash cooled. There is little opportunity for air to re-enter the product during filling. Practically the only air sealed within the container is the amount within the head space. Due to the greater temperature range, from filling temperature to cooling, volume contraction is greater than with conventional procedure. For this reason the container is filled as full as possible and, with practically no air throughout the mass of the product, unusually high vacuums can be obtained after cooling. With steam flushing of the headspace at the time of sealing, it is easy to adjust the resulting vacuum to any reasonable value, because any air that is sealed within the head space is more than twice as dense as air at atmospheric pressure.

With metal containers, ends having a domed profile are used to facilitate proper filling of the container and to accelerate cooling of its contents. The ends are so designed that they assume their normal concave position only when the internal absolute pressure becomes from 8 to 9 lb. less than the pressure outside the container.

Effects of air pressure on personnel

Because health and safety considerations should be of first importance, considerable investigation has been made on the subject of personnel working under conditions of pressure greater than atmospheric. There are a number of States that have rules and regulations governing operation of personnel at elevated pressures, and they permit a normal 8 hr. day if the pressure does not exceed 20 lb. gauge. At higher pressures, the length of time permitted per shift is slightly reduced. The Bureau of Mines published a report covering personnel working under compressed air in constructing the under-water tunnels in the New York Metropolitan area. The records go back to the turn of the century.

There is no hazard involved in entering a higher pressure zone, therefore personnel entering a pressurised area can safely increase the pressure at any rate desired. There may be some slight discomfort experienced if the rate of increase is extremely rapid but no hazard is involved. In going from atmospheric pressure to 20 lb. gauge a maximum of 2 min. would be required. Recently a Navy diver increased pressure from atmospheric to 265 lb. gauge in less than 9 min., a rate of increase of 30 lb./min. There is no hazard in working at elevated pressure. In fact, there is considerable evidence pointing to beneficial results from a health standpoint when exposed to superatmospheric pressure. More than twice as much oxygen is passed into the lung cavity at each inhalation. Elimination of carbon dioxide is accelerated when oxygen is under higher pressure.

The hazard involved when working under higher than atmospheric pressure is caused by too rapid decompression. If decompression is too fast, excess nitrogen previously dissolved in the blood comes out of solution and forms bubbles in the blood circulatory system. If decompression is accomplished under proper control, there is no hazard. The Bureau of Mines report previously referred to shows that of 809,838 decompressions from pressures up to 22 lb. gauge, only 16 cases of compressed air sickness resulted, and all of those were trivial.

In determining the best practice for decompression precedure a study has been made of all avail-

Interior mechanism of product heater removed for cleaning.

able State codes, recommendations from Navy Experimental Diving Unit, National Advisory Committee for Aeronautics (Pressurised wind tunnel at Langley Field, Va.); National Naval Medical Center (Bethesda, Md.); The Chief of the Bureau of Medicine and Surgery (U.S. Navy); U.S. Naval Medical Research Laboratory, New London Conn. and the Bureau of Mines, Dept. of Interior. A composite recommendation of these several agencies indicates that no time is required for decompression when operating pressure is 15 lb. or less, and that a maximum time of 10 min. for decompression is needed when exposed to 20 lb. pressure for 4 hr.

In the high pressure diving chamber at the Navy Diving School in Washington, D.C., Boatswain's Mate Harold Wiesbrod was subjected to a pressure of 265 lb. which was equal to an open sea dive of 561 ft. This is 18 times normal atmospheric pressure. He suffered no ill effects from the experience. This should indicate that if ordinary and reasonable precautions are used, there is no hazard involved for people working within the pressure chamber at pressures required for the successful operation of the Smith-Ball process.

Description of the chop suey installation

Chop suey is a formulated product containing vegetable components, some of which would be seriously denatured and damaged by prolonged processing at high temperature. Other ingredients, such as beef or chicken, require a longer cook. The ingredients that require longer cooking are precooked, others, including Mung bean sprouts and celery, require very little or no pre-cooking. The chop suey is delivered to the hopper of the product feed valve and passed into the product heater. The heater consists of a thin, stainless steel belt operating in a steam atmosphere of about 50 lb. gauge, being from 280 to 300°F. The chop suey is spread out in a thin layer on the belt in order quickly to heat it to the temperature of the steam. Actually there are three belts within the heater, being super-imposed to reduce the overall length. The belts are 0·015 in. thick, 36 in. wide and each belt is 14 ft. long between pulley centres. The product enters the heater at about 200° and is heated in a few seconds to from 280 to 300°F. The product is in the heater from 1 to 2 min.

The product is passed out of the heater by means of a special arrangement whereby it is flash cooled, at a controlled rate, to from 250 to 260°, and at this temperature it is passed into the pressure chamber and carried directly to the bowl of the filler.

A summary of the more important features of the process are:

1. Products can be heated very rapidly to very high temperatures, using the type of heat exchanger which is best suited to the physical character of the product.
2. The product can be partially cooled but still filled and closed at a temperature high enough to ensure sterility.
3. Cans and ends can be either completely or partially presterilised.
4. Regular conventional filling and closing equipment is used.
5. Processing time is the same, regardless of size of container being filled.
6. The pressure chamber can be designed to accommodate as many lines as may be required.
7. High sanitary standards can be maintained owing to provision for sterilising the entire interior of the processing chamber and all of the equipment contained therein.
8. Air required for ventilation is sterilised before being introduced into the pressure chamber.
9. Less damage to containers due to continuous machine handling, compared with the rough treatment necessary in loading and unloading retort baskets, can unscramblers, etc.
10. Ease of processing with glass containers, eliminating hazard of loosening covers due to errors in pressure cooling in retorts.

The process is covered in the U.K. by British patent 676,468 and facilities are available for erecting plants in this country.

★ PROGRESS IN 1954 ★

The Ice Cream Industry

By E. Humphriss, A.R.I.C., M.I.Biol.

Three recent developments of importance to the ice cream industry have been the revised recommendations for limiting lead in foods, the proposals for the addition of antioxidants to foods, and the report on colouring matters in foods. In addition, the British Standards Institution has published various recommendations affecting the industry, while the amended Food and Drugs Bill now before Parliament will almost certainly influence codes of practice in the industry. Against this background there have been several developments in manufacture, presentation and retailing of ice cream. This article covers developments past, present and future that appear to be important, or potentially so, to ice cream manufacturers.

IN a survey of developments in the ice cream industry legal requirements probably merit first notice. The Chemical Standard for ice cream remains at fat = 5%, milk-solids-not-fat = 7·50%, sugar = 10%. These are, of course, minima; and in the opinion of many people within the industry could be raised with advantage when next the Food Standards Advisory Committee review the matter.

Sub-committees of this body have recently considered and reported on three subjects of importance to ice cream manufacturers:

1. Lead in foods.[1]
2. The use of antioxidants in foods.[2]
3. Colouring matters used in foodstuffs.[3]

The revised recommendations for limits for lead in foods schedules a number of foods (para. 14) and prescribes various limits for their maximum permissible lead content. Ice cream, iced lollies, and similar frozen confections are, along with beverages, limited to 1 part lead per million parts of food.

The same committee's report dealing with the use of antioxidants in foods recommends that the Public Health (Preservatives, etc., in Food) Regulations be amended so as to permit the addition of specified antioxidants to foods. It is proposed to allow antioxidants to be added to edible oils and fats, etc., and margarine, but not to butter. Essential oils, isolates and concentrates, but not flavouring essences, may also be protected by the addition of the prescribed antioxidants.

If these recommendations are adopted, compounded foods will be permitted to contain that amount of antioxidant(s) necessarily introduced by the use of an ingredient legitimately containing an antioxidant. Obviously, ice cream made from margarine or vegetable oils may contain antioxidant(s) derived from these components, without incurring censure.

The report on the use of colouring matters in foods is a document well worth studying, and not susceptible to summary treatment except to state that 32 synthetic and 13 naturally occurring colours are recommended as constituting the first permitted list of food colours in Britain.

Recent British Standards

The British Standards Institution several months ago published B.S. 2472: 1954,[4] which recommended methods for the determination of total solids, fat, sucrose and reducing sugars, nitrogen, ash, calcium and phosphorus. In view of recent correspondence in *Nature*, one should perhaps substitute the word "estimation" for "determination" in the above sentence; however, the B.S.I. Committee employ the longer word.

The estimation of non-fatty-milk-solids, or their assessment by calculation (a legal requirement in the implementing of the Chemical Standard for ice cream), was not dealt with in B.S. 2472. Nor were methods recommended for the determination of lactose. Both omissions were presumably due to the uncertainties and difficulties associated with a precise and reproducible evaluation of these two components of mix.

There is ample evidence that study of the problems involved in (*a*) estimating lactose and (*b*) calculating the M.S.N.F. content of ice cream from analytical data is being actively pursued.

British Standard 2450: 1954, "Annatto for dairy products,"[5] should also be consulted by anyone using this vegetable tinctorial matter. Rather surprisingly, one of the largest manufacturers of both oil-soluble and aqueous annatto colour informed the writer a month or two ago that not one of his customers had, then, referred to B.S. 2450 when ordering annatto supplies.

Heat treatment regulations

The Heat Treatment Regulations applying to ice cream remain in force; three alternative time-temperature combinations are now officially recognised:

1. Not less than 150°F. for 30 min.
2. Not less than 160°F. for 10 min.
3. Not less than 175°F. for 15 sec.

These cover all normal requirements for mix pasteurisation from

the Holder method (1) to H.T.S.T. (3).

Food and Drugs Bill

The amended Food and Drugs Bill, the so-called Clean Food Bill, now before Parliament will almost certainly result in codes of practice for the food manufacturing industries, including ice cream. The establishment of these hygienic codes originated with the Report of the Catering Trade Working Party, "Hygiene in Catering Establishments,"[6] published three years ago, which, incidentally, should be consulted, particularly by retailers of ice cream not already familiar with its recommendations. So also should the "model byelaws" issued by the Ministry of Food in 1949 covering the handling, wrapping and delivery of food and sale of food in the open air,[7] and the handbook "Clean Catering."[8] There is much of moment to both makers and vendors of ice cream in these publications. It seems that the food industry as a whole and the perishable food manufacturing and distribution sections in particular are on the threshold of an era of much closer control and supervision, implemented through the appropriate officers of the local authorities.

Control of overrun

So far as one is aware, there are as yet no positive signs that bacteriological standards are imminent, nor that active consideration is being given to the control of overrun. Rightly or wrongly, it is the writer's opinion that the introduction, a few years ago, of the modified methylene blue test for ice cream, and the grading system based on it, was intended as the framework for a bacteriological standard. Doubtless the dissatisfaction generally expressed with this anomalous test has been responsible for official reticence and lack of further developments. Attention to the statutory control of the degree of aeration of ice cream is, it seems, likely to be deferred until final chemical standards, replacing the current tentative ones, are set up. In the writer's opinion the fairest basis for any contemplated legislative control of swell or overrun would be to require a minimum calorific value per unit volume of ice cream. By this means, the manufacturer of a high-fat product would be automatically allowed to take a higher overrun than that appropriate to a poorer quality ice cream. The rationale of this idea will be evident when it is recalled that the calorific value of fat is twice that of protein and carbohydrate; its adoption would not involve additional analytical determinations over and above those usually performed on ice cream.

Bacteriological testing

Reports from laboratories of the Public Health Laboratory Service, on routine bacteriological testing of ice cream, show an increasingly detailed examination.

In addition to the usual investigations, the presence or absence of fæcal coli, coagulase-positive staphylococci, and (sometimes) so-called fæcal streptococci is recorded. This is, on the whole, a welcome development provided due regard is paid to the various anomalies in the interpretation of these data.[9]

Incidentally the close parallel between coagulase and phosphatase production shown by staphylococci[10] may well provide ice cream laboratory workers with a simple method of routine control for the presence of presumed pathogenic staphylococci in ingredients, product, and even personnel. Workers interested should also consult the letter of Lominski, Smith, and Morrison[11] reporting a coagulase-destroying factor produced by variants of *Staph. aureus*.

Technical developments

The last year or two has seen no major technical developments in the industry as a whole, although several innovations at present under test or reaching the quantity production stage must be mentioned.

The automatic, heat-sealed, plant packaged unit of ice cream has arrived; further evolution of this project will be watched with interest. An automatic coin operated, ice cream vending machine is now in production in this country which should solve many of the problems associated with retail sales of ice cream, problems in many ways peculiar to the industry. Cellulose ethers are receiving attention as mix stabilising agents; the author's own experiments so far have not succeeded in completely overcoming the unwanted syneresis effects which these substances, in common with certain gums, tend to exhibit on melt-down of the frozen ice cream.

The employment of quaternaries as both plant and server "sanitisers" is now commonplace. The bactericidal efficiency of these compounds is established; they are, incidentally, extensively used by surgeons and the medical profession in general for, among other things, sterilisation of the skin. There may well be a future here for their use in connection with the personal hygiene drill now operative in most well-run ice cream establishments, not excluding the retail sales point. The next obvious development, that of combining an efficient detergent with an active quaternary or other "non-poisonous, non-corrosive, germicide," seems to have reached the stage where samples are available to the food industry for test, and where their marketing is imminent.

Lack of technical training

Lack of technical training facilities is still a major deficiency in Britain. There is not a single technical, agricultural, or dairy college offering a comprehensive course in ice cream technology in Britain. Maybe in the fulness of time, the National College of Food Technology will provide the overdue facilities, although obviously it is up to the industry itself to press, incessantly, the urgency of the matter.

Presentation of ice cream

There are signs that determined, imaginative, efforts are being made to introduce variety and novelty into the presentation of ice

cream to the consumer. The reception accorded to special flavours, etc., has been anything but encouraging in the past, owing, possibly, to the traditional conservatism of the British people combined with a lack of authentic quality in the products offered. There is evidence that this state of affairs is changing and ice cream manufacturers and dispensers should take notice of the fact that chocolate and fruit flavoured milk drinks are already commanding an encouraging response from the public, and may well become competitive with ice cream this season. It is obvious that thought should be given forthwith to meeting this potential challenge by those within the industry who have so far chosen to ignore these facts.

The decision as to what is eventually to be regarded as genuine ice cream cannot be postponed indefinitely. It was originally essentially a dairy product containing only butterfat. Are we to "revert to type" or continue to regard vegetable oils as legitimate fat components of mix, leaving the 10% or so M.S.N.F. to justify the description "a dairy product"? In this connection the present pattern of the "frozen confection" industry in the U.S.A. is of interest. Ice cream remains ice cream, with, generally speaking, a required 10% minimum butterfat content. Soft ice milk is increasing in popularity; in tests it shows fat 2% to 6%, serum solids 11% to 16%, sugars 12% to 18%, and is served soft frozen. Imitation ice cream, the frank Californian description of a product analogous to our "ice cream," is also apparently being permitted and produced in an increasing number of States. The American product, *Mellorine*, is, of course, essentially a substitute or imitation ice cream. It would seem that these three products are destined to coexist, side by side, for some time to come in the U.S.A. The position there is the reverse of that here; the outcome may well be congruence on both sides of the Atlantic.

Transparent plastic (styrene) containers are being used as small ice cream "cartons" in America and Canada and would seem to provide an extremely attractive pack.

Rather surprisingly a proprietary non-carbohydrate sweetener, calcium cyclamate, is advertised for use in low-fat ice cream in American journals. Presumably the very considerable attention being devoted to the "overweight" problem in the U.S.A. is the reason for advocating the use of a synthetic mix sweetener of virtually nil calorific value. This compound is, incidentally, said to be about thirty times sweeter than sucrose on a weight for weight basis.

The rigid requirements in regard to the sanitary design of ice cream plant and equipment operative in the U.S.A. is a commendable feature and illustrates the degree of control under which both the trade itself and the plant manufacturers function.

Novel variegated ice creams recently introduced to the American public include, among others, a vanilla ice cream containing blobs of chocolate and a candy containing flavoured product. It is not without interest to note that pre-packed sherbets are also rapidly achieving popularity over there, while "stick novelties" continue to hold their own.

Retailing

A novel point was put to the writer a month or so ago; its mention here will doubtless provoke some hard thinking and possibly a spirited reaction in more than one quarter. It was argued that, since retailers of sugar confectionery stock "all the popular lines" irrespective of their particular manufacturing source, so also retailers should own their own conservators and likewise "stock all the popular makes" of ice cream. An interesting thought, this, fraught with divers possibilities.

More than one seer of the industry is prophesying a return, at any rate in some measure, to the producer-retailer status of the ice cream trade. If this forecast is well founded, we may expect to see the manufacturers of 18% single dairy cream, and synthetic cream, as well as the dairyman processing homogenised milk, advertising their products as particularly suitable for incorporation in ice cream mix made on a small scale by retailers not possessing homogenising plant. There may well be a future for the indigenous equivalent of the American soft ice milk, not to mention soft frozen ice cream, in this direction.

REFERENCES

1. Food Standards Committee Report on Lead, 1954, H.M.S.O., 6d.
2. Food Standards Committee Report on Antioxidants, 1954, H.M.S.O., 6d.
3. Food Standards Committee Report on Colouring Matters, 1954, H.M.S.O., 1s.
4. B.S. 2472:1954, Methods for the Chemical Analysis of Ice Cream, 3s.
5. B.S. 2450:1954, Annatto for dairy products, 2s.
6. Hygiene in Catering Establishments, 1951, H.M.S.O., 1s. 9d.
7. Model byelaws, Series I, 1949, H.M.S.O., 3d.
8. Clean Catering, handbook on hygiene in catering establishments, 1953, H.M.S.O., 2s. 6d.
9. E. L. E. Humphriss, Problems associated with Ice Cream manufacturing and distribution, *J.S.D.T.*, March, 1954.
10. M. Barbe and S. W. A. Kuper, Pyogenic Staphylococci, Coagulase and Phosphatase production, *J. Path. Bact.*, 1951, **63**, 65.
11. I. Lominski, D. D. Smith, and R. B. Morrison, A Coagulase-destroying Factor produced by variants of Staph. Aur., *Nature*, 1953, **171**, 214.

New Chemical from Sugar

Until recently, aconitic acid was produced only in small amounts as an expensive dehydration product of citric acid. The free acid and its esters, which are widely used as plasticisers, are now made commercially from calcium magnesium aconitate which is recovered from sugar cane molasses. The world's entire supply of aconitate is produced as a by-product by the plant of Godchaux Sugars, Inc., at Raceland, Louisiana. The process is very simple, according to *Industrial and Engineering Chemistry* (February, 1955). Aconitic acid is precipitated from molasses with calcium chloride, the resultant product is separated from a diluted molasses solution, and the solid material is dried and packed, the molasses being reconcentrated by evaporation.

In addition to the chemical and engineering techniques employed, the operation involves "in transit" processing of blackstrap molasses from nearby mills. Treated molasses produced at Raceland has improved processing qualities and fermentation properties.

★PROGRESS IN 1954★

THE VITAMINS – 2

By F. A. Robinson, M.Sc.Tech., LL.B., F.R.I.C.

(*Allen and Hanburys Ltd., Ware, Herts.*)

In the first part of this review, which appeared last month, Mr. Robinson covered research on vitamins A, C, D and E and reported on the synthesis of the coenzyme, flavin adenine dinucleotide. In this second and concluding part he reviews progress in the vitamin B_{12} complex, pantothenic acid, biotin, folic acid and thioctic acid.

Coenzyme A in fatty acid metabolism

Once again most of the work on pantothenic acid has been directed at finding out in greater detail the manner in which the vitamin promotes *in vivo* acylations, and a summary of the mechanism by which fatty acids are synthesised in the body has been published.[56] Acetyl-coenzyme A passes through a cycle of enzymic reactions by which it combines first with an acetyl group to form acetoacetyl-coenzyme A, which is then reduced to butyryl-coenzyme A. This passes through a similar cycle forming eventually caproyl-coenzyme A, and the cycle is repeated several times until finally stearoyl coenzyme A is formed. Coenzyme A is also a key substance in the integration of fatty acid metabolism with carbohydrate metabolism.

The biosynthesis of coenzyme A has been studied in both bacteria[57] and pigeon liver.[58] *Lactobacillus arabinosus* can synthesise the coenzyme from either pantothenate or pantetheine, the former being converted first into pantothenic acid 4′-phosphate. *Acetobacter suboxydans* apparently synthesises the coenzyme by a similar series of transformations. Benzoyl pantetheine and metal ions have been found to serve as models of the acylating enzymes.[59] Acetoacetyl-, β-ketohexanoyl- and β-ketooctanoyl-coenzyme A have been prepared.[60] The biosynthesis of cholesterol in the rat appears to depend on the dietary pantothenate and on the coenzyme A content of the tissues.[61] The effects of a pantothenate deficiency in the guinea pig have been described;[62] these resemble those reported in other species. Pantothenic acid has been claimed[63] to exert a significant protection against the injurious effects of radio-active phosphorus, and its antagonist, pantoyltaurine, was, rather surprisingly, almost as effective. Methods of synthesising pantetheine, pantethine and related compounds have been reported.[64]

Biotin

Biotin is not a vitamin of very great significance in human nutrition and most of the papers published during the year describe the effects of biotin and related compounds on the growth of micro-organisms. Of possibly more general interest is the observation that biotin may be concerned in the synthesis of enzymes necessary for the fermentation of sugars.[65] An interesting relationship has also been reported[66] between biotin and inositol on the one hand and biotin and folic acid on the other, biotin overcoming the inhibitory action of γ-hexachlorocyclohexane on the production of amylase and riboflavin by inositol, using *Aspergillus oryzæ* as test organism, and folic acid potentiating this inhibitory action. Biotin-*d*-sulphoxide, but not the *l*-isomer, has been shown to be as active as biotin in stimulating the growth of yeast.[67] Biotin *l*-sulphoxide has been isolated from a natural source—culture filtrates of *Aspergillus niger*—and characterised chemically.[68] An improved synthesis of biocytin (ε-N-biotinyl-L-lysine) has been described,[69] and an enzyme capable of hydrolysing biocytin has been detected in the blood.[70] The effect of various vitamins on the intestinal synthesis of biotin in the rat has been reported.[71]

Folic acid and citrovorum factor

A large number of papers dealing with folic acid have been published during the year, although many of these are concerned with the preparation and antibacterial properties of folic acid antagonists. Of the publications more closely related to nutrition several are devoted to a consideration of the mode of action of folic acid. It now seems clear that tetrahydro folic acid rather than folic acid itself is the substance responsible for the biosynthesis of serine in liver; it brings about one-carbon transfers by combining with a formyl group at the N^5 and N^{10} positions to give an imidazoline which then reacts with glycine and water to form serine.[72] A similar mechanism appears to be involved in the transfer of a one-carbon group to a purine precursor.[73] Leucovorin (the citrovorum factor or formyl-tetrahydrofolic acid) can apparently effect the synthesis of serine,[74] but it is not so effective as tetrahydrofolic acid.[72] Leucovorin was effective in preventing a severe aplasia of the bone marrow in rats following administration of aminopterin.[75] Two men with scurvy and associated anæmia, resulting from the feeding of a scorbutic diet, displayed a hæmatological response to folic acid and this was potentiated by the subsequent administration of ascorbic acid.[76]

A new synthesis of pteroylglutamic acid has been described[77] in which diethyl N-tosyl-*p*-aminobenzoyl-L-glutamate is reacted

with 2:3-oxido propionaldehyde diethyl acetal, the product oxidised and finally condensed with 2:4:5-triamino-6-hydroxypyrimidine to give the tosyl derivative of folic acid. Acylated folic acids can be prepared[78] by reacting a perbromide of 2-acylamino-4-hydroxy-6-methyl pteridine with an aminobenzoic acid amide. The synthesis of formyl tetrahydrofolic acid has also been patented.[79] Paper chromatographic methods for separating folic acid from related compounds have been described[80] and also a novel method of purifying crude folic acid by adsorption of impurities on alkaline earth oxides or carbonates.[81]

Folic acid can be converted into citrovorum factor by micro-organisms, *Leuconostoc citrovorum* for instance; ascorbic acid or some other reducing agent must be added to the substrate.[82] The conversion can also be effected by chick liver homogenates,[83] but in this instance ascorbic acid does not increase the amount of citrovorum factor formed.

The vitamin B_{12} complex

Once more, as judged by the volume of papers published, vitamin B_{12} represents the most rapidly developing field in vitamin science. Although no major addition to our knowledge of the structure of vitamin B_{12} has been made during the last two years, it has been shown[84] that the part of the vitamin B_{12} molecule not yet characterised contains three primary amide groups which can be hydrolysed stepwise; the acidic products can be reconverted into vitamin B_{12} by amidation. The most important advance in the chemistry of vitamin B_{12}, however, is in the relation between true vitamin B_{12} and the vitamin B_{12}-like factors isolated from fæces. Thus pseudo-vitamin B_{12} differs from vitamin B_{12} in containing adenine in place of 5:6-dimethylbenzimidazole whilst pseudo-vitamin B_{12d} contains 2-methyladenine[85] and the so-called factor H 2-methylhypoxanthine.[86] These fæcal factors are apparently formed by intestinal bacteria according to the relative abundance of the right nucleotide or its precursor.[87] In fact by growing a vitamin B_{12}-requiring mutant of *Escherichia coli* on media containing appropriate precursors, new analogues of vitamin B_{12} have been produced, some of which are clinically effective in pernicious anæmia.[88]

One or two improvements in the methods used to isolate vitamin B_{12} from natural sources have been described. In one method[89] a solution of vitamin B_{12} is extracted into a water-insoluble phenol and the solution is treated with an organic base forming a water-insoluble complex which is sparingly soluble in the phenol. In another method[90] vitamin B_{12} is recovered from solutions by adsorption on an anion exchange resin in the presence of cyanide followed by elution. The compound obtained by treating vitamin B_{12} with sodium bisulphite has been claimed to be particularly stable and its use in multivitamin preparations is advocated.[91] The most favourable *p*H for a mixture of cyanocobalamin and ascorbic acid is between 6 and 7.[92] Compounds made by the addition of simple aliphatic amines to vitamin B_{12} have also been described.[93] A suggestion has been made[94] that activated sewage sludge, being rich in vitamin B_{12}, might provide a useful source of vitamin B_{12} for pigs.

Role of vitamin B_{12}

The precise role of vitamin B_{12} is still attracting a great deal of attention. It has been reported that the addition of vitamin B_{12} reduces or even suppresses the synthesis of pantothenic acid by *E. coli*,[95] and that a deficiency of vitamin B_{12} leads in the chick to an increase in total pantothenic acid content of the livers.[96] Both these observations might be explained if vitamin B_{12} were essential for the conversion of pantothenic acid into coenzyme A.

Vitamin B_{12} plays an important role in carbohydrate and lipid metabolism and possibly controls blood glutathione concentration.[97] It is not now believed to be involved in the direct transmethylation from methionine to choline.[98] Vitamin B_{12} increases the biological value of soya bean protein.[99] Finally, not only are vitamin B_{12} and folic acid concerned together in different stages in the synthesis of nucleic acids, but vitamin B_{12} influences in some way either the storage or intake of folic acid.[100]

Vitamin B_{12} assays

A simple method of assaying vitamin B_{12} in crude liver extracts has been described[101] in which the liquid is extracted with a mixture of butanol and chloroform; ultimately the purple colour of the dicyano complex is measured. A much more elaborate procedure involving numerous extractions with different solvents and chromatographic purification has been described[102] for isolating vitamin B_{12} from complex mixtures. To compensate for losses in the recovery process, a known amount of radio-active vitamin B_{12} is added to the original preparation and the percentage radio-activity recovered is used to apply a correction factor. Vitamin B_{12} is destroyed by ascorbic acid in the presence of certain ions, of which copper is the most effective, and vitamin B_{12b} is destroyed even more readily, but in both instances the effect is prevented by the addition of potassium cyanide or sodium diethyldithiocarbamate.[103] None of the metal ions alone inactivates vitamin B_{12}. Metabisulphite also protects vitamin B_{12}, and it has been recommended that in estimating the vitamin B_{12} content of livers, the homogenised tissue should be digested with pepsin for 1 hr. and then steamed with metabisulphite for 5 min.[104] The livers from cow, buffalo, sheep and goat were found to contain 1·2 to 1·3 μg per g., the pig and rabbit 0·6 and chicken 0·27 μg per g. when assayed microbiologically by this method. Similar results were obtained by other workers using on the one hand simple autoclaving[105] and on the other[106] extraction with N/10 acetate buffers of *p*H 4·6 to 5·6 in dilute cyanide solution; with both

E. coli and *L. leichmannii*, values of 0·6 and 1·3 μg per g. were obtained from different samples of sheep's liver. In the assay of liver extracts *E. coli* has also been claimed[107] to give results comparable with those obtained by *L. leichmannii*, although certain types of crude extracts may give higher results with the former than with the latter,[108] and they may also contain a factor that binds added vitamin B_{12}, making it unavailable to the test organism. Serum vitamin B_{12} can be estimated by *L. leichmannii*.[109] Patients with pernicious anæmia, megaloblastic anæmia and idiopathic steatorrhœa showed values less than 130 μμg per ml.

Oral administration of vitamin B_{12}

Considerable attention has been devoted to the oral administration of vitamin B_{12}. Although large doses of vitamin B_{12} given by mouth to patients with pernicious anæmia will give a response, this method is very wasteful. Thus the response with 2 to 9 mg. by mouth was similar to that obtained by 20 to 100 μg. given intramuscularly.[110] The efficiency is greatly increased if the so-called intrinsic factor is given at the same time. Thus 15 μg of vitamin B_{12} given with 150 mg. of dried pyloric mucosa gave a satisfactory response.[111] No evidence of hæmatological or neurological relapse was seen after 6 months' continuous treatment.[112] In subjects with normal gastric function, however, intrinsic factor does not appear to increase the absorption of vitamin B_{12} beyond a certain point.[113] A new technique for measuring the absorption of vitamin B_{12} following the oral administration of a mixture of the vitamin and an intrinsic factor preparation has been developed using vitamin B_{12} containing radioactive cobalt. The potency of the intrinsic factor preparation can be estimated by measuring the radioactivity in the fæces. Thus in normal subjects only 30% of the radioactivity in the test dose was recovered from the fæces whereas in patients with pernicious anæmia nearly 90% was recovered; this fell to about the normal value when intrinsic factor was given at the same time.[114] Similarly the urinary excretion of radio-activity in pernicious anæmia patients was increased when gastric juice was given along with vitamin B_{12} containing radioactive cobalt.[115] It has also been claimed[116] that the potency of an intrinsic factor preparation can be assessed by giving it together with a standard dose of radioactive vitamin B_{12} and measuring the hepatic uptake of the latter by scintillation counting of the radioactivity of the overlying skin area. When this technique was used to study the efficiency of absorption of varying amounts of vitamin B_{12} it was found[117] that the higher the dose the lower the proportion of vitamin B_{12} absorbed, the efficiency falling from 90 to 3% when the dose was increased from 0·5 to 50 μg. This led to the suggestion that in addition to Castle's intrinsic factor there may exist an "intramural intestinal B_{12}-acceptor" responsible for the partial mucosal block to the absorption of vitamin B_{12} in the intestine of normal humans. Its role may be similar to that of apoferritin in the intestinal absorption of iron.

Several claims have been made for the preparation in a more or less pure state of the intrinsic factor or of the intrinsic factor-vitamin B_{12} complex. Thus one group of authors[118] fractionated desiccated defatted hog stomach by a combination of *iso*electric and ammonium sulphate precipitations, thereby obtaining a product 3,000 times as potent as the starting material, although not electrophoretically homogeneous. There was no correlation between the ability of the factors to bind vitamin B_{12} *in vitro* and their intrinsic factor activity. Another group of workers[119] claims to have isolated the intrinsic factor as a homogeneous mucoprotein with a molecular weight of 20,000. A third group[120] claims to have isolated from hog gastric mucosa and crystalline cyanocobalamin, a conjugated protein which is pink in colour and contains about 10 μg cobalamin per mg. in combination with (rather than adsorbed on) a protein; this appears to be identical with the intrinsic factor.

The intrinsic factor of gastric juice and pyloric mucosa is not the only substance capable of binding vitamin B_{12}. Thus blood serum will do so, the α-globulin fraction being almost solely responsible for this effect.[121] So will the milk of certain animal species,[122] especially that of the sow, from which a protein was isolated capable of binding about 20 μg. of vitamin B_{12} per mg. This protein will also bind pseudovitamin B_{12} and related factors to about the same extent. Certain types of crude liver extract also contain substances that bind with vitamin B_{12} so that the latter is incapable of stimulating the growth of test organisms.[108]

Thioctic acid and bifidus factor

In last year's review the identification of thioctic acid, also known as α-lipoic acid and protogen, with dithiacyclohexane-6-butyric acid was reported. Its isolation from liver and its separation into at least two components by counter-current distribution and chromatographic adsorption have now been described.[123] The major component has the structure given above, but a second component is believed to be a thiosulphinyloctanoic acid. More details have been given of the synthesis of thioctic acid.[124]

L-Dihydro-orotic acid, like orotic acid, is a growth factor for various lactobacilli, but the D-isomer is not, and may actually antagonise the effect of L-dihydro-orotic acid.[125]

A new bacterial growth factor known as the "bifidus factor" has been reported. Concentrates prepared from human colostrum, human milk or hog mucin, not only promote the growth of *Lactobacillus bifidus*, from which the name of the factor is derived, but also stimulate the growth of rats.[126] Purification of the new factor was facilitated by the isolation from the stool of a breast-fed infant of a strain of *L. bifidus* for which the new substance was an essential growth factor. This factor is present in human milk, but

not in cow's milk, and in various secretions such as saliva and amniotic fluid. It appears to be a polysaccharide of low molecular weight containing N-acetyl-glucosamine.

REFERENCES

[56] F. Lynen, *Nature*, 1954, **174**, 963.
[57] W. S. Pierpoint and D. E. Hughes, *Biochem. J.*, 1954, **56**, 130; J. Baddiley *et al.*, *Biochem. J.*, 1954, **56**, *Proc.* xxii; G. M. Brown and E. E. Snell, *J. Bact.*, 1954, **67**, 465.
[58] G. D. Novelli *et al.*, *J. Biol. Chem.*, 1954, **206**, 533.
[59] R. Schwyzer and C. Hürlimann, *Helv. Chim. Acta*, 1954, **37**, 155.
[60] H. Heinert, *J. Biol. Chem.*, 1953, **205**, 575.
[61] G. S. Boyd, *Biochem. J.*, 1953, **55**, 892; B. B. Migicovsky and D. M. Greenberg, *Biochim. Biophys. Acta*, 1954, **13**, 135.
[62] M. E. Reid and G. M. Briggs, *J. Nutr.*, 1954, **52**, 507.
[63] C. Artom, *Proc. Soc. Exp. Biol. Med.*, 1954, **86**, 162.
[64] E. Walton *et al.*, *J. Amer. Chem. Soc.*, 1954, **76**, 1146; R. E. Bowman and J. F. Cavalla, *J. Chem. Soc.*, 1954, 1171.
[65] A. G. Moat and H. C. Lichstein, *Arch. Biochem.*, 1954, **48**, 300.
[66] M. O. Tirunarayanan and P. S. Sarma, *Current Sci.*, 1954, **23**, 55.
[67] D. B. Melville *et al.*, *J. Biol. Chem.*, 1954, **208**, 503.
[68] L. D. Wright *et al.*, *J. Amer. Chem. Soc.*, 1954, **76**, 4156, 4160, 4163.
[69] J. Weijlard *et al.*, *ibid.*, 1954, **76**, 2505.
[70] L. D. Wright *et al.*, *Proc. Soc. Exp. Biol. Med.*, 1954, **86**, 335.
[71] W. E. Ham and K. W. Scott, *J. Nutr.*, 1953, **51**, 423.
[72] R. L. Kisliuk and W. Sakami, *J. Amer. Chem. Soc.*, 1954, **76**, 1456; R. L. Blakley, *Nature*, 1954, **173**, 729.
[73] G. R. Greenberg, *J. Amer. Chem. Soc.*, 1954, **76**, 1458.
[74] J. Lascelles *et al.*, *J. Gen. Microbiol.*, 1954, **10**, 267.
[75] E. C. de Renzo and F. I. Dessau, *Proc. Soc. Exp. Biol. Med.*, 1954, **86**, 231.
[76] J. H. Jandl and G. J. Ganuzda, *ibid.*, 1953, **84**, 452.
[77] D. I. Weisblat *et al.*, *J. Amer. Chem. Soc.*, 1953, **75**, 5893.
[78] American Cyanamid Co., B.P. 711,387.
[79] American Cyanamid Co., B.P. 708,304, 709,574.
[80] S. F. Zakrzewski and C. A. Nichol, *J. Biol. Chem.*, 1953, **205**, 361; R. Radhakrishnamurty and P. S. Sarma, *Current Sci.*, 1954, **23**, 266.
[81] Upjohn Co., B.P. 713,853.
[82] G. E. Foley and E. C. Haley, *J. Bact.*, 1953, **66**, 727.
[83] V. M. Doctor *et al.*, *Arch. Biochem.*, 1954, **48**, 249.
[84] J. B. Armitage *et al.*, *J. Chem. Soc.*, 1953, 3849; D. E. Gant *et al.*, *Biochem. J.*, 1954, **56**, *Proc.* xxxiv.
[85] H. W. Dion *et al.*, *J. Amer. Chem. Soc.*, 1954, **76**, 948.
[86] F. B. Brown and E. Lester Smith, *Biochem. J.*, 1954, **56**, *Proc.* xxxiv.
[87] J. E. Ford and E. S. Holdsworth, *ibid.*, 1954, **56**, *Proc.* xxxv.
[88] K. H. Fantes and C. H. O'Callaghan, *Biochem. J.*, 1954, **58**, *Proc.* xxi; J. E. Ford *et al.*, *ibid.*, xxiv.
[89] American Cyanamid Co., B.P. 708,037-8.
[90] Merck and Co., B.P. 711,754.
[91] Abbott Labs., B.P. 698,624.
[92] A. Bartilucci and N. E. Foss, *J. Amer. Pharm. Assoc.*, 1954, **43**, 159.
[93] British Drug Houses Ltd., B.P. 701,535.
[94] H. E. Schendel and B. C. Johnson, *J. Agric. Food Chem.*, 1954, **2**, 23.
[95] J. Jännes, *Experientia*, 1954, **10**, 31.
[96] G. E. Boxer *et al.*, *Arch. Biochem.*, 1953, **47**, 474.
[97] C. T. Ling and B. F. Chow, *J. Biol. Chem.*, 1954, **206**, 797.
[98] J. Firth *et al.*, *Proc. Soc. Exp. Biol. Med.*, 1954, **86**, 307; R. J. Young *et al.*, *J. Nutr.*, 1954, **53**, 233.
[99] B. R. Baliga *et al.*, *Nature*, 1954, **174**, 35; *Current Sci.*, 1954, **23**, 51.
[100] H. O. Nieweg *et al.*, *J. Lab. Clin. Med.*, 1954, **44**, 118.
[101] F. W. Van Klaveren *et al.*, *Current Sci.*, 1953, **22**, 142.
[102] F. A. Bacher *et al.*, *Anal. Chem.*, 1954, **26**, 1146.
[103] E. M. Stapert *et al.*, *J. Amer. Pharm. Assoc., Sci. Ed.*, 1954, **43**, 87.
[104] K. G. Shenoy and G. B. Ramasarma, *Arch. Biochem.*, 1954, **51**, 371.
[105] H. E. Scheid and B. S. Schweigert, *J. Nutr.*, 1954, **53**, 419.
[106] M. C. Dawbarn and D. C. Hine, *Austral. J. Exp. Biol.*, 1954, **32**, 1.
[107] F. J. Bandelin and J. V. Tuschhoff, *J. Amer. Pharm. Assoc., Sci. Ed.*, 1954, **43**, 474.
[108] F. A. Robinson *et al.*, *Nature*, 1954, **174**, 558.
[109] R. H. Girdwood, *Brit. Med. J.*, 1954, **2**, 954.
[110] J. N. M. Chalmers and Z. M. Hall., *Brit. Med. J.*, 1954, **1**, 1179.
[111] E. Meulengracht, *Brit. Med. J.*, 1954, **1**, 838.
[112] C. P. Lowther *et al.*, *Lancet*, 1954, **1**, 495.
[113] M. E. Swendseid *et al.*, *Proc. Soc. Exp. Biol. Med.*, 1954, **86**, 834.
[114] S. T. Callender *et al.*, *Brit. Med. J.*, 1954, **1**, 10; N. G. Heatley *et al.*, *Lancet*, 1954, **2**, 578.
[115] R. F. Schilling, *J. Lab. Clin. Med.*, 1953, **42**, 860.
[116] G. B. Jerzy Glass *et al.*, *Arch. Biochem.*, 1954, **51**, 251.
[117] *Idem.*, *Proc. Soc. Exp. Biol. Med.*, 1954, **86**, 522; *Science*, 1954, **120**, 74.
[118] W. H. Prusoff *et al.*, *Blood*, 1953, **8**, 491.
[119] A. L. Latner *et al.*, *Lancet*, 1954, **1**, 497; *Biochem. J.*, 1954, **57**, *Proc.* xix.
[120] H. G. Wijmenga *et al.*, *Biochim. Biophys. Acta*, 1954, **13**, 144.
[121] W. R. Pitney *et al.*, *J. Biol. Chem.*, 1954, **207**, 143.
[122] M. E. Gregory and E. S. Holdsworth, *Nature*, 1954, **173**, 830; *Biochem. J.*, 1953, **55**, 830
[123] E. L. Patterson *et al.*, *J. Amer. Chem. Soc.*, 1954, **76**, 1823, 1827.
[124] M. W. Bullock *et al.*, *ibid.*, 1954, **76**, 1828; Q. F. Soper *et al.*, *ibid.*, 4109; E. Walton *et al.*, *ibid.*, 4748.
[125] C. S. Miller *et al.*, *J. Amer. Chem. Soc.*, 1953, **75**, 6086; *Proc. Soc. Exp. Biol. Med.*, 1953, **84**, 716.
[126] P. György *et al.*, *Proc. Soc. Exp. Biol. Med.*, 1953, **84**, 464; *Arch. Biochem.*, 1954, **48**, 193, 202, 209, 214; R. M. Tomarelli *et al.*, *ibid.*, 225.

Tomato Powder Manufacture

A FLAKY, quick-mixing tomato powder that makes highly palatable juice has been produced at the U.S.D.A.'s Western Regional Research Laboratory in Albany, California. The process consists of a modification of methods successfully applied in the vacuum dehydration of orange juice to produce a puffed powder with very low moisture content.

According to *Food Engineering* (1955, **27** (1) 111) air is whipped into whole tomato juice concentrate to bring it to the point of a meringue-like consistency. It is then dried under vacuum. This process was found to be practical and economically promising when concentrates containing 25 to 38% solids were used. Spray drying has also produced a product with good quality and free-flowing characteristics. The powder has a greater packing density than the vacuum-dried product produced in earlier experiments, but it mixes with water less readily.

The tendency of the warm particles to stick together and accumulate on the walls of the dryer and in the powder-collecting system, was one of the spray-drying difficulties which had to be overcome. It was found that this tendency is reduced if the tomato juice is made by the hot break process (to preserve most of the natural pectin unchanged). Also, there is less sticking when the amount of salt normal for a beverage juice is added. A small amount of bisulphite is also put into the concentrate to stabilise the product against heat damage in the dryer. Further control of sticking has been achieved by admitting air at room temperature into the lower part of the dryer body to cool and condition the surfaces of the powder particles before they enter the primary cyclone collector. A stream of cool dehumidified air then picks up the powder from the base of the first collector and conveys it to a final collector, accomplishing some additional drying on the way.

Preserved Foods for the Swedish Larder

By Charles H. Sporle

PART 1. CANNING AND PRESERVES MANUFACTURE

The output of the preserved foods industry in Sweden has quadrupled in the last 25 years and is now in the region of 70,000 tons per annum. A significant part in the development of the industry has been played by the Findus organisation, which was established in 1941 by the Marabou chocolate concern. Today this company makes a large variety of preserved foods ranging from canned vegetables and fruits to quick-frozen chicken, fish and vegetables. The company's success is due entirely to its progressive outlook, which is shown in all its activities from vegetable cultivation to quick freezing. Here is the first part of a two-part article on the Findus organisation, its processes and products.

IN 1941 Marabou, the leading firm of chocolate makers in Sweden, formed a canning subsidiary under the name of Findus and acquired a family business, which was renamed Findus, at Bjuv, a tiny village in Skåne, south-west Sweden. It was a small concern, employing 5-10 people all the year round, and only 25-50 in the busy summer season. The buildings were primitive and the standards of production fell far short of modern practice, but the choice of Bjuv as a centre of operations was a far-sighted one. Sweden, with its varying climatic belts stretching over 1,400 miles, grows about 20% of its food in Skåne.

Bjuv, located near to Hälsingborg, and with rail connections to the rest of Sweden, is an ideal site for a company producing preserved foods. More land was purchased and a modern plant was installed.

Backed by the scientific and technical resources of Marabou, the company's production of preserved foods had risen by 1954 to some 20,000 tons valued at £4 million. Production falls under seven main heads:

1. Canned vegetables, soft and other fruits, and meat.
2. Canned soups.
3. Jams, marmalade and fruit juices.
4. Baby foods.
5. Mayonnaise.
6. Quick-frozen foods.
7. Cake mixes, puddings, etc.

Quality tests of peas during processing are continuously made by tenderometer. Records are kept at all stages for final grading.

Agricultural research

To attain the high standards voluntarily imposed required expert technical knowledge. At that time little experimental work had been done in Sweden to develop crops suitable for the canning industry, and one of the problems facing the new enterprise was the development of varieties which would mature both earlier and later than those normally grown. This applied particularly to crops grown on contract, such as peas and beans. Owing to the short growing season the whole crop tends to reach maturity in a very close sequence. If the season could be extended for only two or three weeks, the pack could be greatly increased and still more efficient use made of plant capacity. The solution of this problem has still to be reached, and Findus is undertaking its own research. About 1,200 acres at Bjuv are given over to experimental crops, including an experimental farm adjoining the factory. Strains of raspberries and strawberries have been developed to suit local conditions and methods for controlling raspberry pests and weeds in pea fields have been evolved. The Findus staff have taken the farmers into their confidence and advise them on soil and cultivation problems.

Strawberry growing

The demand for strawberries exceeds the supply in Sweden. Findus alone could use the major part of the production available to the canning industry. The company therefore began to encourage the cultivation of strawberries in Halland, Knäred and Breared parishes, and in the Nissan valley, areas well suited to the plant. Where necessary Findus supplies plants on credit to encourage production. These are paid for at cropping time. Some 300 growers now operate in these areas.

Another new growing area was opened up in Blekinge, a county of stony fields difficult to make productive. Here more than 200

growers have turned over to the new crop, which is quick-frozen at the communally-owned freezing plant in Karlskrona.

Pea production

A similar success has been achieved with peas, a crop better suited to larger acreage farms. To ensure that really fresh material is available for processing, the peas are grown within a six miles' radius of Bjuv. They are grown on a four years rotation system under contract, at prices fixed in the spring. The company's experts test the soil in each case, and only those farms suitable for the crop are accepted. As soon as the crop matures, the company's swathers cut and windrow the vines, and a mechanical loader travelling down the rows sweeps them into a truck moving alongside. As each truck is filled it is driven direct to the viner station adjoining the factory. The viner station control room maintains constant radio contact with four radio cars operating with the harvesters. Thus a smooth flow is maintained and, if necessary, the picking can be called off, so that none of the essential qualities of the crop are lost by bottlenecks in the sequence of operations. The pea harvesting in July is intensive, proceeding day and night. A team of six men operating a cutter, loader and truck, harvests four acres/hr.

Thirteen American pattern and six British viners, with a capacity of eight tons of peas per hour, thresh the crop immediately upon arrival. The vines and shucks are reloaded continuously and driven off to waiting buyers as cattle feed.

The peas are washed and shucked by machinery and spot samples are taken by the laboratory staff. From the vining station they are pumped over an elevated conduit direct to the processing plant. Quality tests during processing are made continuously by tenderometer, records being kept at all stages for the final grading. The peas are graded in rotating sieves, collected into hoppers, conveyed to blanchers, quality graders and picking belts, and so to the automatic fillers, where cans are filled with peas and brine simultaneously. The cans are then fed direct to one of three seamers operating at 200 lids/min.

The cans are finally sterilised in retorts, packed in cardboard containers and conveyed by fork-lift truck to the store, which has 9,000 sq. yd. of floor space. The peas are canned within 3 hr. of harvesting.

Other vegetable products

In addition to canned peas in three grades (large, medium and small), Findus market canned cucumber (gherkins), peas and carrots, carrots whole and diced, mixed vegetables, cut beans and frozen spinach.

Vegetables have not until late years figured largely in the Swedish national diet. Spinach, however, is an important item of food, yielding two crops per season in southern Sweden. Retaining its full, vital qualities for about 4 hr. after harvesting, it is an ideal vegetable for processing. As with peas, it is harvested and loaded mechanically into trucks; in an 8 hr. shift two men cover an area of 3·7 acres. Within 4 hr. the spinach is processed in the special plant installed for the purpose.

Here it is sifted and passes under powerful water jets to free it from sand and weeds, etc. This stage is followed by washing in three consecutive tanks under strong water pressure to complete the final cleansing. Meanwhile spot samples are examined under the microscope to ensure that the spinach is free from sand. It is then sorted, every alien leaf or stalk being eliminated before it is chopped and packed in lacquered Cellophane bags. It is then ready for quick-freezing. The spinach is sold at the same price all the year round—Kr. 1:30 for 375 g. (1s. 9d. lb.). This is well below the high season price for five months of the year.

Preserves

An important part of Findus' programme at Bjuv is devoted to preserves: orange and Seville orange marmalade, apricot marmalade, Snabbkräm in two flavours, raspberry and strawberry, apple sauce (from Gravensteiner apples), lingon berry, raspberry, strawberry and blackcurrant jam.

Only fresh or quick-frozen whole fruit is used. Snabbkräm, a smooth tasting preserve, which retains to the full the delicate flavour and aroma of the fresh fruit, is made of apple pulp, quick-frozen raspberries or strawberries, and sugar. From the pre-cooker and Pfaudler vacuum cooker stages, it passes via twin 1,000 litre holding tanks, where the temperature is dropped to 136°F., to a 14-in-a-row filler of the company's own design. Then follows a journey through a 30 m. long continuous cooling tunnel. "Satello" cans are fed from a store adjacent to the filling point. At the conclusion of the 45 min. journey the Snabbkräm has acquired the skin denoting that it has set correctly. After cooling, the cans pass to the unscrambler and so to the capping line running back alongside the cooling tunnel. Caps are fed from an overhead drum to the capper in tandem with an automatic heat-sealer operating at the rate of 140/min. The capacity of the whole unit is 40,000/day.

Much the same procedure is followed for jams and marmalade. For the latter, peel is stored in wooden barrels containing water and SO_2. The juice, in a 6-1 concentrate, is kept frozen pending use. Swedish marmalade is a clear, aromatic product, quite unlike the dark Oxford type marmalade so popular in England. After shredding, in a Turnbull's patent marmalade shredder, the peels are blanched in jacketed kettles. Peel strips, concentrated juice and sugar are weighed manually, and the same cooking sequence is followed as for Snabbkräm. From the cooking stage, however, the mixture is pumped to a filling line across the floor and put into glass jars, which are first passed through a washing and sterilising chamber for 12 min., and then through an illuminated checking

Spinach – Harvested and Processed in Four Hours

Spinach is an important item of food in Sweden, yielding two crops per season. It is an ideal vegetable for processing as it retains its full vital qualities for about 4 hr. after harvesting. The first photograph shows the special equipment used for harvesting spinach. At the factory it is given a preliminary wash to free it from sand and weeds. Then follows the next stage (shown below) where it is washed in three consecutive tanks under strong water pressure. It is then sorted carefully, chopped and packed automatically into lacquered "Cellophane" bags ready for quick freezing (photo, top right). It is sold at the same price all the year round, about 1s. 9d./lb., which is well below the high season price for five months of the year.

station. The jars are then led off at right angles to the vapour vacuum closer. Labelling follows at 120/min. The containers are then packed by hand, 20 to a carton, fed on to a band, glued automatically and run under a pressure band to effect the closure.

Fruit juice

Fruit juice is very popular as a beverage in Sweden. Of an estimated 10 million gal. consumed annually, some 90% is home made. The production of sweetened and concentrated "saft" of the Swedish type is an important part of Findus operations. It is manufactured either from fresh gathered or fresh, quick-frozen fruit, with added sugar and citric acid. A full declaration of the contents is printed on the label.

The production of "Hallon" or Raspberry "saft" is a typical example of the fruit juice manufacturing process. From a radius of 6-9 miles round the factory the fruit, picked that day, is brought in each evening in 1 lb. cardboard containers stacked on wooden pallets, for processing that night or early next morning. The average daily picking varies between 10 and 40 tons dependent on weather conditions and available labour. From the press the pulp is pumped to an Alfa-Laval separator, from which it passes to mobile stainless steel bins. These, and others containing sugar, are brought to the primary cooking stage in the cooker to ensure homogeneity, before passing to the second stage. Each 900 kg. batch is held at 158°F. for 20 min.

From the second cook the mixture passes to the holder for sterilisation at 176°F. and so to the filling heads. Half-litre bottles pass through the steam cleaner and steriliser in three stages—soda washing, clean water rinsing and steam sterilising. They then pass to the 20-head filler, where the product is filled. Only factory new bottles are used. The output is 35,000 per 8½ hr. day. After filling, the bottles receive a warm water spray rinse, and then a cold one. From this point the bottles

A view of the pea canning section, showing the automatic fillers where peas and brine are filled simultaneously. The filled cans pass to the seamers (battery of three, left), and are placed in baskets for sterilising in retorts.

proceed by the same labelling line as that used for marmalade. A bottle containing plain water inserted in the line signals the completion of each "cook" to the labelling attendant, who is responsible for ensuring that every batch bears the correct code number. The finished product is then despatched in the same way as for marmalade.

These operations, like all others at Bjuv, are under constant laboratory check. As it is necessary quickly to ascertain the finished soluble solids content, spot samples are taken at the vacuum-cooking stage and the percentage read off by a refractometer.

Four varieties of fruit juice are manufactured at Bjuv: raspberry, strawberry, orange, and black-currant. The last is guaranteed to contain at least 120 mg. Vitamin C per decilitre of concentrated juice.

Soups, mayonnaise and baby foods

In order to keep the plant operating in off seasons, the company produces meat soup with vegetables, vegetable soup, white cabbage with meat balls, tomato soup, artichoke soup, minestrone, and mushroom soups. The Swedish speciality Nypon Soppa (hips soup), rich in vitamin C, is in good demand. The technical experience gained by Marabou in fat problems has enabled the industrial production of mayonnaise to be added to the programme at Bjuv. The Findus organisation also produces a number of prepared baby foods: "Välling" (gruel), carrot, mixed vegetable, artichoke purée, apple and apricot purée, French plum purée and Nypon purée.

Close scientific control is maintained at every stage in the processing of these special foods. The modern research laboratories at Bjuv conduct constant tests of these special diets, and are in regular consultation with infant specialists at leading hospitals.

The wide experience of chocolate manufacture available to Findus has resulted in the production of chocolate pudding, caramel custard, cake mixes and baking powder. The ubiquitous tomato sauce, pre-cooked apple pie, beef pies, chicken and apple sauce are recent additions.

These additional lines are important balancing factors in the year's operations, reducing overheads and ensuring continuity of employment. Findus is a well-rounded organisation which has progressed steadily in the last decade.

(The second part of this article will deal with quick-freezing.)

SOME SUPPLIERS OF EQUIPMENT

Hoppers: *Findus AB., Hälsingborg.*
Graders (for quality): *Food Machinery and Chemical Corpn., U.S.A.*
Automatic fillers: *Chisholm Ryder Co. Inc., U.S.A.*
Sterilising retorts: *Halar Jerngjuteri, Getinge Mekaniska Verkstad, Sweden.*
Washers and water jets: *Food Machinery and Chemical Corpn., U.S.A.*
Canning line, cooling tunnel and capper: *Findus AB.*
Turnbulls patent shredder: *Wm. Brierley, Collier and Hartley, Rochdale.*
Sorting line for soft fruit: *Hälsingborg, Findus AB.*
Pfaudler vacuum boiler: *Pfaudler Co., U.S.A.*

Fluorinated foods reduce tooth decay

TOOTH decay has been greatly reduced in laboratory animals by a diet of fluorine-rich foods, grown with special fertilisers, according to an article by McClendon and Gershon-Cohen of the Albert Einstein Medical Centre, Philadelphia, in a recent issue of the *Journal of Agricultural and Food Chemistry*.

Only 25% of fluorine-fed rats suffered dental caries, whereas more than 81% of a control group on a fluorine-free diet has decayed teeth, state the authors. It was observed, however, that some of the fluorine-fed animals exhibited fluorosis (evidence of too much fluorine). The rats on a fluorine diet also gained more weight than the others.

Corn, corn roots and leaves of camellias grown in soil enriched with fluorine-containing phosphate fertiliser were used to prepare the special diets. In other experiments, goitre in rats was prevented with a diet prepared from crops grown in iodine-enriched soil. In this case, sunflower seeds and leaves were used.

The authors emphasise that these experiments with animals were not performed in order to develop special crops for human consumption. The particular foods used were chosen because they readily take up fluorine or iodine.

Concentrated Vanillas

HOW THEY ARE MADE, HOW TO USE THEM

By James J. Broderick

(*Flavour Chemist, Givaudan Flavors Inc.*)

A subject that cannot be overlooked in discussing vanilla is that of concentrated vanilla. Like the rest of the vanilla picture, it is burdened with false tales, half-truths and uncertainties. Although concentrated vanillas are used successfully with genuine economy where the use of the normal extract would be impossible, in many cases the substitution of concentrated vanilla results in an inferior flavour and product. The following article explains the reasons for the use, as well as the shortcomings, of concentrated vanillas.

THE more concentrated vanillas are manufactured by the vacuum distillation of an extract of vanilla which has been prepared either in the normal way or by maceration or percolation with other suitable diluted solvents such as denatured alcohol, *iso*-propyl alcohol or acetone. Products manufactured in this manner are usually five-fold, ten-fold or twenty-fold vanilla or oleoresin of vanilla—4 oz. and 6 oz. For example, in the U.S., a five-fold vanilla should contain five times 13·35 oz. or 66·75 oz. bean extractives per U.S. gal. A 4 oz. oleoresin, for example, should contain the extractive matter of 13·35 oz. beans in 4 oz. (wt.) of the oleoresin of vanilla so that when 4 oz. (wt.) of the oleoresin are made into 1 gal. of extract containing 35% alcohol (vol.) it will have exactly the same constants as an extract made in the normal manner.

Concentrated vanillas have a great advantage economically because of an appreciable saving in alcohol since approximately the same amount of alcohol is needed for a ten-fold vanilla as is needed for a single strength extract. In addition, there is a further saving in bottling, packaging, shipping and storage. Concentrated vanillas would be used universally if the concentrated product retained the full strength and quality of flavour as a properly prepared single strength extract. This is not so, however, and the disadvantages of concentrated vanillas must be realised.

In the manufacture of a five- or ten-fold vanilla, the vanilla beans are extracted in the normal manner with diluted ethyl alcohol or one of the above mentioned solvents. The extract is then subjected to vacuum distillation to recover the solvent and concentrate the extract. If ethyl alcohol is the solvent, a portion of the recovered alcohol is retained and added to the concentrated extract to obtain the desired alcoholic content. This has an advantage that the use of other solvents does not have, and that is, that part of the flavour that is lost in the distillate is restored to the concentrate. The distillation is continued until the desired concentration is obtained. If the distillation is prolonged, the concentrated product is a viscous, semi-solid mass called oleoresin of vanilla. This product is marketed non-alcoholic.

Flavour and aroma

It has been found that during the concentration of vanilla some of the aromatic portion of the flavour is lost even if the concentration takes place under vacuum at very low temperatures. Gnadinger[1] proved the inferiority of heat concentrated vanillas as compared with the normally processed vanilla in a series of well-devised experiments.

Different varieties and grades of beans were macerated with both ethyl alcohol and acetone (60% by vol.) and concentrated to various degrees of concentration. The original beans were adjusted for variation in moisture content and the various concentrated extracts were diluted to the original strength and analysed along with the original extract to see the effect, if any, on analytical constants. The following conclusions were drawn as a result of these investigations. The vanillin loss is negligible if distillation or evaporation of solvent is carefully and slowly carried out. The ash, reducing sugars, sucrose, non-sugar solids and vanillin resins were not changed by distillation. Gnadinger did find that the acetone extracts had lower lead numbers and ash than the corresponding alcoholic extracts but that resins in the acetone extracts were 50% higher. The total acidity other than vanillin was lower in the distilled extracts than in the originals.

The distilled extracts were compared for flavour and aroma with the originals. These comparisons were made at 3% and 5% dilutions in distilled water and in every case, the original extracts were stronger in flavour and aroma than the corresponding distilled extracts. The loss in flavour and aroma increased with the degree of concentration. An attempt was made to express this loss quantitatively by comparing different dilutions of the distilled extracts with the 5% dilutions of the original extracts. The alcohol content was adjusted in making these comparisons. It was impossible, of course, to express the loss in flavour accurately in percentages, but comparisons by a number of observers placed the loss at not less than 10% when the degree of concentration was five-fold or more.

The loss of aroma was more pro-

nounced than the loss in flavour, and the aroma of the more concentrated extracts had almost entirely disappeared. The loss in flavour and aroma was not marked in an extract concentrated less than a three-fold. An extract concentrated approximately five-fold showed at least a 10% loss in flavour and the extract concentrated to a ten-fold showed even greater loss in flavour and aroma. The flavour of the extract concentrated approximately 24-fold was quite different and inferior even to the ten-fold. A Tahiti bean extract concentrated to 26-fold lost more than 40% of its flavour. This larger loss in flavour in the case of Tahiti beans is undoubtedly due to the larger percentage of volatile oil in these beans which is largely responsible for its flavour.

The distillates from the concentration of the extracts were extracted with ether, which spontaneously evaporated. The residues had the characteristic odour of the volatile oil of vanilla. The distillate from Tahiti extract was rich in anisic alcohol and heliotropine. Because of the minute amount of volatile oil in the distillate it is impractical to attempt to recover it and return it to the concentrate. However, as already pointed out, it is advisable to use recovered alcohol (when used) as the necessary solvent in the concetrate (where alcohol is necessary).

To check the possibility that decomposition of the flavour due to heat of distillation was responsible for some flavour changes, Gnadinger took portions of the original extracts and heated them in sealed flasks at 98°C. for 1 to 4 hr. He found that there was no apparent difference in flavour or aroma and felt reasonably sure that the loss in flavour was therefore largely due to volatilisation of flavouring material.

Examination of a number of commercial concentrated vanillas disclosed that, when diluted to standard strength, they were, when free from adulterants, weaker in flavour and aroma than standard vanilla extracts. Gnadinger found, however, that this deficiency of flavour and aroma was made up, in some cases, by the addition of flavouring materials foreign to vanilla. This practice resulted in concentrates that were strong in flavour but not in true vanilla flavour.

Analysis of oleoresin

Wilson and Sale[2] recognising the difficulty in analysing an oleoresin of vanilla on one hand, and its rather widespread adulteration, on the other hand, set up an elaborate procedure for the analysis of oleoresin. That is probably helpful in cases where the adulteration is rather crude. As with vanilla extracts, taste and aroma are the real signposts of an adulterated product and experience in vanilla will soon trace down the type of adulterant used. We would certainly refer to the original article by Wilson and Sale if a thorough investigation of concentrated vanilla is being attemped. Our own experience has taught us, however, that after a thorough examination of taste, aroma and physical properties, the best procedure is to make a single strength extract from the concentrated vanilla and run a regular analysis on the extract.

Gnadinger, using a 60% alcoholic menstruum for extraction, felt that the maximum amount of beans needed per lb. of oleoresin containing 25% moisture in the finished product was 2·59 lb. A commercial 4 oz. oleoresin should contain 13·35 oz. bean extractives to 4 oz. oleoresin or 53·4 oz. (3·34 lb.) to 1 lb. of oleroesin. Gnadinger felt such a concentration was impossible. Wilson and Sale using a 47½% alcoholic menstruum found that they obtained 1 lb. of oleoresin from 2·2 lb. Mexican beans, 1·7 lb. Bourbon beans, and 1.85 lb. Tahiti beans. It is obvious that these figures would also fluctuate considerably with the moisture content and grade of the vanilla beans used and the moisture content of the finished oleoresin. They also found that using a 65% alcoholic menstruum it took 3 lb. of Bourbon beans to get 1 lb. of oleoresin of vanilla. It is, therefore, obvious that since the yields vary greatly with the moisture content, and grade of bean and the moisture content of the finished oleoresin, that the solvent and dilution of the solvent used greatly influences yield; and that a wide latitude of yields is obtained with different varieties of beans—then the weight of beans equivalent to one part of oleoresin cannot be determined analytically and no standard for the amount of bean extractives per lb. of vanilla oleoresin is practical.

It must be remembered that the tests run by Gnadinger and Wilson and Sale were performed in a laboratory under ideal and carefully controlled conditions. Therefore, under normal conditions the yields of oleoresin will not be as good commercially since it is not possible to chop vanilla beans as fine for percolation as for maceration, and maceration for long periods of time with large quantities of beans is usually impractical. When vanillas are concentrated commercially greater losses in vanillin and the other aromatics are obtained since the slow removal of solvent under very low vacuum is usually not as efficient on a commercial scale.

Effects of concentration

The conclusions that Gnadinger arrived at as a result of his experiments on vanilla beans certainly are reasonable ones and experience will show that, if anything, his estimation of flavour losses due to concentration are on the conservative side. His conclusions in this connection were:

1. Concentration of vanilla extract by vacuum distillation causes a loss of flavour and aroma. The extent of the loss depends on the degree of concentration and the kind of bean. The quality of the flavour as well as its strength is changed. If the degree of concentration is high, the aroma is almost entirely destroyed.
2. Distillation does not cause a marked change in chemical

composition but there is a loss of volatile acids and volatile oil.

3. The loss of flavour and aroma is not due to decomposition or chemical change but to volatilisation of flavouring materials.
4. Prime vanilla extract which has not been subjected to distillation is superior in quality of flavour, strength of flavour and aroma to vanilla extract which has been concentrated.

Optimum vanilla concentration

With this knowledge of the advantages and disadvantages of concentrated vanillas, what is the optimum concentration of vanilla? What strength vanilla should be used in various type products?

It is impossible to manufacture efficiently concentrated vanilla extracts of a strength greater than about a four-fold without resorting to vacuum distillation to effect the concentration. This is due, of course, to the fact that the bulk of beans becomes too large for the amount of menstruum and also to the lowering of the solvent power of the menstruum as it becomes saturated with extracted material. In the modern vanilla percolator, it is impossible to go above a $2\frac{1}{2}$-fold vanilla without danger of complete stoppage of the circulating system, owing to the bulk of beans involved. This would vary somewhat with the variety of bean, less Tahiti beans could be extracted owing to their gummy nature while more Java beans could undoubtedly be processed since these beans very seldom become gummy and produce exceptionally clear extracts. A four-fold vanilla can be produced by prolonged maceration in air-tight, stainless steel tanks, the contents of which are regularly agitated. This method, although lengthy, results in a superior flavoured product owing to the ageing that takes place and the fact that the beans are not exhaustively extracted, which usually results in an unfavourable flavour balance. In our opinion it is well worth the additional expense and time to manufacture.

As stated, concentrations higher than four-fold are obtainable only by concentration with heat and the greater the concentration, the greater the flavour loss. Owing to the fact that the aromatic portions are lost in concentration, the ideal flavour balance is lost and consequently concentrated vanillas have a typical vegetable extractive-like flavour and lose a good part of their balsamic aromatic character.

Although the amount of flavour lost depends on the degree of concentration, it is not in proportion to the degree of concentration, so that the difference in flavour loss between a ten-fold vanilla and in oleoresin is not too great. For ease of manufacture most concentrated vanillas are made by diluting an oleoresin of vanilla with alcohol and water to the desired strength. However, we feel that the most satisfactory results can be obtained, where concentrations higher than a four-fold are necessary, by adding oleoresin of vanilla to a four-fold macerated vanilla until the desired strength is obtained. This will guarantee at least a maximum of full bodied, aromatic vanilla flavour. For example, a five-fold vanilla made by adding an oleoresin to a macerated four-fold will contain almost 80% of a real unimpaired vanilla flavour. A ten-fold can be made in which three-fold or 30% of the flavour comes from a non-distilled product. These products will be superior in flavour to comparable strengths made entirely by distillation. We would advise the use of products of this type where concentrated vanillas must be used.

Where to use concentrated vanillas

In ice cream, candies, fondants, icings, baked goods, syrups, marshmallow, toppings and products of this nature there is no disadvantage in the use of a true vanilla $2\frac{1}{2}$ to four-fold in strength and there is real economy attained as compared with the use of a single strength extract. We would strongly advise the use of more concentrated vanillas wherever possible if this concentration does not involve concentration by heat.

In products such as vanilla powders, powdered ice cream mixes, vanilla sugars, and powdered mixes of various types, it is necessary to use the more highly concentrated vanillas since owing to the quantities needed, the less concentrated products cannot be efficiently distributed through the powder. In these cases the less concentrated product used, the better the flavour obtained. For example, if oleoresin of vanilla is being used in a vanilla pudding powder in conjunction with vanillin for flavour, a superior flavour would be obtained if a ten-fold vanilla was substituted in equivalent amounts for the oleoresin. This would only be possible if the increased liquid volume could be efficiently dispersed in the powder and the superior flavour would depend on the ten-fold vanilla not being manufacture from an oleoresin of vanilla. In the use of concentrated vanillas the rule to follow is to obtain a properly processed and unadulterated product and use the lowest degree of concentration (down to approximately a four-fold) that is practical.

Recommended manufacturing processes

There can be no ideal method of manufacture outlined for concentrated vanillas. One has to set up a method of manufacture that gives the best quality product possible under the limitations put upon the manufacturer. We feel that the manufacture of a four-fold vanilla by maceration is the ideal basis for the manufacture of concentrated vanillas even though its manufacture requires months and entails tying up large sums of money in alcohol and vanilla beans. If this is impossible we certainly would recommend the use of a $2\frac{1}{2}$-fold vanilla made by percolation or one of the more rapid methods.

Our next step would be the manufacture of an oleoresin of vanilla. This process is very similar to the manufacture of vanilla extract in that the beans are macerated or percolated in the normal manner with diluted solvents. We prefer using a denatured alcohol

since its solvent properties are better defined than acetone or *iso*-propyl alcohol and the use of ethyl alcohol requires a great deal of caution to meet the requirements of the U.S. Alcohol Tax Unit for recovered spirits. We recommend a double maceration or percolation if time permits a final washing of the beans with water which is added to the extract in the still for concentration. The only change in the maceration or percolation procedure (as compared with vanilla extracts) is that the sugar is generally not added to the menstruum although small amounts of glycerine are sometimes added to increase the bulk or viscosity of the final oleoresin. The product is concentrated under as low a vacuum as possible. Generally the vanillin content of the finished oleoresin needs adjustment owing to the losses in concentration but care in concentration can eliminate this necessity.

If the demand of a particular organisation is primarily for a ten-fold or twenty-fold vanilla, and the manufacture of a four-fold macerated vanilla is impractical, the best procedure is to make the ten- or twenty-fold vanilla in the same manner as the oleoresin of vanilla, with two exceptions. First, the concentration is not carried as far, of course, and second, ethyl alcohol is used as the solvent so that the fractions containing the most aromatic can be returned to the concentrate to give the desired alcohol content to the finished extract (generally 35 to 40% by volume).

These are the recommended procedures for the manufacture of authentic concentrated vanillas where flavour is the primary consideration. Unfortunately, concentrated vanillas are very often sub-standard or adulterated. For example, the addition of between 4·5-5 oz. vanillin to a five-fold pure vanilla will increase its strength to a ten-fold and if sold as a ten-fold can reap a nice profit for the seller. However, the adulteration of concentrated vanillas is generally much more subtle.

Although we know that it is possible to manufacture an oleoresin of vanilla using 3·34 lb. of beans lb. of oleoresin, if flavour is the prime consideration, generally the bean content of an oleoresin is closer to that suggested by Gnadinger and Wilson and Sale and yield is the primary consideration. Maximum yields are obtained by increasing the amount of water-soluble material dissolved which is accomplished by following a high alcoholic extraction with a lower alcoholic extraction and very often with an alkaline extraction. Gnadinger's work made it obvious that an added acetone extraction would increase the amount of resins dissolved. The finished oleoresin manufactured in this manner is diluted with glycerine, sugar or corn syrup until the minimum requirements of lead number and resins are obtained.

REFERENCES

[1] C. B. Gnadinger, Effect of Vacuum Distillation on Vanilla Extract, *Ind. Eng. Chem.*, 1927, **19**, 342-4.

[2] J. B. Wilson and J. W. Sale, Evaluation of Commercial Vanilla Oleoresins, *ibid.*, 1926, **18**, 283-5.

Food Oil Supplies Greater Than Ever

WORLD supplies of vegetable oils available for food uses in 1954 were appreciably greater per head of the population than in pre-war years. "Vegetable Oils and Oilseeds 1954," a review of production, trade, utilisation and prices, recently published by the Commonwealth Economic Committee,* shows that total world output of vegetable oils in 1953-54 was the highest ever recorded and some 25% above the pre-war level. Preliminary details for 1954-55 indicate that a very high level of production should again be reached, but that world stocks are probably lower than a year ago. The Commonwealth accounted for a quarter of world exports in 1953, thereby maintaining its pre-war position.

Net supplies of vegetable oils and oilseeds entering into world trade during 1953 amounted to some 3·6 million tons, in oil equivalent, an increase of 6% over the previous year but less than the record post-war level of 3·9 million tons in 1951 and the 1938 figure of 4·3 million tons. Preliminary details for 1954 indicate a further rise in trade, due mainly to heavier supplies of groundnuts, cottonseed oil, copra, palm oil and linseed oil. An outstanding feature was the heavy U.S. exports of cottonseed oil and linseed oil from Commodity Credit Corporation surpluses under special disposal arrangements.

Commonwealth exports in 1953 were maintained at the 1952 level; those from Nigeria reached a new record total and were appreciably greater than exports from any other country during the year, but supplies from India were abnormally small, while the decline in shipments from Ceylon offset increases from Malaya and Canada. In pre-war years the Commonwealth had large export surpluses of edible and edible-industrial oils and oilseeds and a relatively minor import balance in the industrial group. From 1940 to 1952, however, the Commonwealth was a constant net importer, due mainly to the higher level of U.K. purchases for domestic consumption (reflecting the reduced availability of animal fats) and the considerable decline in shipments from India, where consumption has risen more quickly than production. These movements much more than offset the increase in supplies from Nigeria, and in 1948-52 the Commonwealth import balance averaged 86,000 tons in oil equivalent, the deficit in 1951 being as much as 200,000 tons. A marked recovery in 1952, however, was continued during 1953, when the Commonwealth became a net exporter to the extent of some 100,000 tons. Preliminary details for 1954 indicate the maintenance of this position.

Shortly after the end of oils and fats rationing, and the return of private trading, in the U.K. in May, 1954, the Ministry of Food's long-term contracts with the

(*Concluded on page* 161)

* "Vegetable Oils and Oilseeds, 1954." Price 5s. net (5s. 4d. post free), obtainable from H.M.S.O.

Preventive Maintenance of Canning Plant

By D. A. Browne

(D. W. Bingham & Co. Pty. Ltd.)

Preventive maintenance may be defined as the actions taken to ensure as near as possible 100% plant efficiency over the whole of the production period. A preventive maintenance programme should originate from the engineering section, for it is in the interest of their functional responsibility that such a programme is necessary. It must be planned with an appreciation of its costs in relation to the possible savings it can effect, and with a realisation that it must be administered during what may be termed "the economic life of the plant." Once accepted, it must have the full support of management, and the co-operation of all sections who can contribute to its success.

Plant stoppages, due to mechanical failure, maladjustment and the like, disrupt schedules and programmes, and result in increased production costs, and often loss of perishable materials. Although some stoppages are inevitable, many of them can be eliminated by careful analysis, planning and directed action. A successful programme will commence with planned plant purchases, and be followed by carefully engineered installation, efficient directed operation, correct lubrication and regular planned service.

Planned plant purchases

PLANT purchases either for new projects or replacements should be planned in sufficient time to allow for consideration and selection of the most suitable plant. Plant purchases should be the result of project planning, and should not just happen.

An appreciation of the reasons for purchasing plant will assist in determining requirements and will enable provision to be made for both the present and the future.

When possible, plant should be purchased to operate at a little lower than its maximum capacity. Experience has shown that production requirements usually quickly exceed those originally planned, with resulting overloading of plant. The need for plant to withstand the rather severe conditions of a cannery, such as water and fruit acids, must receive careful consideration. Standardisation of plant is desirable, but, where it is not possible with the whole plant, components such as motors, etc., can usually be arranged.

Plant installation

Plant installation must be done in accordance with sound engineering practices and with an appreciation of the conditions under which the plant is to operate. The plant and all relative data should be accounted for on arrival at the factory and directed through a planned programme until such time as it is handed over for operational duty. Manufacturer's instructions, both for installation and operation, should be read thoroughly; the time thus spent will be rewarded by a good installation and a saving of hours of needless worry.

Particular attention should be paid to the services, attachments and transfers, for these are usually supplied and fitted on the job. Although they may appear minor points as regards the plant, they can affect and control the efficiency of the plant.

Types of plant that require dismantling for cleaning should be provided with benches or washing rigs into which the parts taken from the machine for cleaning can be placed. The dropping and rolling of machined parts on the floors will lead to repair and replacement. Provision should be made for housing special tools or equipment supplied with the machine; the use of substitutes usually results in damage.

When finally installed, and before they are forgotten, the little things which will help in future operating—the various spares or change parts supplied with the machine—should be stowed away ready for future use. A check that supplies of suitable lubricants are at hand should be made and lubricating and routine maintenance operating logs should be issued to the persons who will be responsible for these duties.

Efficient directed operation

Plant operators play their part in preventive maintenance, and, if properly instructed and directed, can improve operating efficiency and lower maintenance costs. Apart from the usual instruction of how and when to start and stop the plant, the operator should be carefully instructed and given a copy of the instructions forwarded with the machine. These instructions should be read, discussed and tried by both operator and engineer and, when accepted, become the standard procedure by which operating is performed. Accurate measurement of performance under standard conditions can then be obtained and the results of any alteration to procedure is measurable.

The operator can be of immeasurable assistance to the engineer by reporting minor anomalies which, if unattended, become chronic.

In such cases where the opera-

since its solvent properties are better defined than acetone or *iso*-propyl alcohol and the use of ethyl alcohol requires a great deal of caution to meet the requirements of the U.S. Alcohol Tax Unit for recovered spirits. We recommend a double maceration or percolation if time permits a final washing of the beans with water which is added to the extract in the still for concentration. The only change in the maceration or percolation procedure (as compared with vanilla extracts) is that the sugar is generally not added to the menstruum although small amounts of glycerine are sometimes added to increase the bulk or viscosity of the final oleoresin. The product is concentrated under as low a vacuum as possible. Generally the vanillin content of the finished oleoresin needs adjustment owing to the losses in concentration but care in concentration can eliminate this necessity.

If the demand of a particular organisation is primarily for a ten-fold or twenty-fold vanilla, and the manufacture of a four-fold macerated vanilla is impractical, the best procedure is to make the ten- or twenty-fold vanilla in the same manner as the oleoresin of vanilla, with two exceptions. First, the concentration is not carried as far, of course, and second, ethyl alcohol is used as the solvent so that the fractions containing the most aromatic can be returned to the concentrate to give the desired alcohol content to the finished extract (generally 35 to 40% by volume).

These are the recommended procedures for the manufacture of authentic concentrated vanillas where flavour is the primary consideration. Unfortunately, concentrated vanillas are very often sub-standard or adulterated. For example, the addition of between 4·5-5 oz. vanillin to a five-fold pure vanilla will increase its strength to a ten-fold and if sold as a ten-fold can reap a nice profit for the seller. However, the adulteration of concentrated vanillas is generally much more subtle.

Although we know that it is possible to manufacture an oleoresin of vanilla using 3·34 lb. of beans lb. of oleoresin, if flavour is the prime consideration, generally the bean content of an oleoresin is closer to that suggested by Gnadinger and Wilson and Sale and yield is the primary consideration. Maximum yields are obtained by increasing the amount of water-soluble material dissolved which is accomplished by following a high alcoholic extraction with a lower alcoholic extraction and very often with an alkaline extraction. Gnadinger's work made it obvious that an added acetone extraction would increase the amount of resins dissolved. The finished oleoresin manufactured in this manner is diluted with glycerine, sugar or corn syrup until the minimum requirements of lead number and resins are obtained.

REFERENCES

1. C. B. Gnadinger. Effect of Vacuum Distillation on Vanilla Extract. *Ind. Eng. Chem.*, 1927, **19**, 342-4.
2. J. B. Wilson and J. W. Sale. Evaluation of Commercial Vanilla Oleoresins. *ibid.*, 1926, **18**, 283-5.

Food Oil Supplies Greater Than Ever

WORLD supplies of vegetable oils available for food uses in 1954 were appreciably greater per head of the population than in pre-war years. "Vegetable Oils and Oilseeds 1954," a review of production, trade, utilisation and prices, recently published by the Commonwealth Economic Committee,* shows that total world output of vegetable oils in 1953-54 was the highest ever recorded and some 25% above the pre-war level. Preliminary details for 1954-55 indicate that a very high level of production should again be reached, but that world stocks are probably lower than a year ago. The Commonwealth accounted for a quarter of world exports in 1953, thereby maintaining its pre-war position.

Net supplies of vegetable oils and oilseeds entering into world trade during 1953 amounted to some 3·6 million tons, in oil equivalent, an increase of 6% over the previous year but less than the record post-war level of 3·9 million tons in 1951 and the 1938 figure of 4·3 million tons. Preliminary details for 1954 indicate a further rise in trade, due mainly to heavier supplies of groundnuts, cottonseed oil, copra, palm oil and linseed oil. An outstanding feature was the heavy U.S. exports of cottonseed oil and linseed oil from Commodity Credit Corporation surpluses under special disposal arrangements.

Commonwealth exports in 1953 were maintained at the 1952 level; those from Nigeria reached a new record total and were appreciably greater than exports from any other country during the year, but supplies from India were abnormally small, while the decline in shipments from Ceylon offset increases from Malaya and Canada. In pre-war years the Commonwealth had large export surpluses of edible and edible-industrial oils and oilseeds and a relatively minor import balance in the industrial group. From 1940 to 1952, however, the Commonwealth was a constant net importer, due mainly to the higher level of U.K. purchases for domestic consumption (reflecting the reduced availability of animal fats) and the considerable decline in shipments from India, where consumption has risen more quickly than production. These movements much more than offset the increase in supplies from Nigeria, and in 1948-52 the Commonwealth import balance averaged 86,000 tons in oil equivalent, the deficit in 1951 being as much as 200,000 tons. A marked recovery in 1952, however, was continued during 1953, when the Commonwealth became a net exporter to the extent of some 100,000 tons. Preliminary details for 1954 indicate the maintenance of this position.

Shortly after the end of oils and fats rationing, and the return of private trading, in the U.K. in May, 1954, the Ministry of Food's long-term contracts with the

(*Concluded on page* 161)

* "Vegetable Oils and Oilseeds, 1954." Price 5s. net (5s. 4d. post free), obtainable from H.M.S.O.

Preventive Maintenance of Canning Plant

By D. A. Browne

(*D. W. Bingham & Co. Pty. Ltd.*)

Preventive maintenance may be defined as the actions taken to ensure as near as possible 100% plant efficiency over the whole of the production period. A preventive maintenance programme should originate from the engineering section, for it is in the interest of their functional responsibility that such a programme is necessary. It must be planned with an appreciation of its costs in relation to the possible savings it can effect, and with a realisation that it must be administered during what may be termed "the economic life of the plant." Once accepted, it must have the full support of management, and the co-operation of all sections who can contribute to its success.

Plant stoppages, due to mechanical failure, maladjustment and the like, disrupt schedules and programmes, and result in increased production costs, and often loss of perishable materials. Although some stoppages are inevitable, many of them can be eliminated by careful analysis, planning and directed action. A successful programme will commence with planned plant purchases, and be followed by carefully engineered installation, efficient directed operation, correct lubrication and regular planned service.

Planned plant purchases

PLANT purchases either for new projects or replacements should be planned in sufficient time to allow for consideration and selection of the most suitable plant. Plant purchases should be the result of project planning, and should not just happen.

An appreciation of the reasons for purchasing plant will assist in determining requirements and will enable provision to be made for both the present and the future.

When possible, plant should be purchased to operate at a little lower than its maximum capacity. Experience has shown that production requirements usually quickly exceed those originally planned, with resulting overloading of plant. The need for plant to withstand the rather severe conditions of a cannery, such as water and fruit acids, must receive careful consideration. Standardisation of plant is desirable, but, where it is not possible with the whole plant, components such as motors, etc., can usually be arranged.

Plant installation

Plant installation must be done in accordance with sound engineering practices and with an appreciation of the conditions under which the plant is to operate. The plant and all relative data should be accounted for on arrival at the factory and directed through a planned programme until such time as it is handed over for operational duty. Manufacturer's instructions, both for installation and operation, should be read thoroughly; the time thus spent will be rewarded by a good installation and a saving of hours of needless worry.

Particular attention should be paid to the services, attachments and transfers, for these are usually supplied and fitted on the job. Although they may appear minor points as regards the plant, they can affect and control the efficiency of the plant.

Types of plant that require dismantling for cleaning should be provided with benches or washing rigs into which the parts taken from the machine for cleaning can be placed. The dropping and rolling of machined parts on the floors will lead to repair and replacement. Provision should be made for housing special tools or equipment supplied with the machine; the use of substitutes usually results in damage.

When finally installed, and before they are forgotten, the little things which will help in future operating—the various spares or change parts supplied with the machine—should be stowed away ready for future use. A check that supplies of suitable lubricants are at hand should be made and lubricating and routine maintenance operating logs should be issued to the persons who will be responsible for these duties.

Efficient directed operation

Plant operators play their part in preventive maintenance, and, if properly instructed and directed, can improve operating efficiency and lower maintenance costs. Apart from the usual instruction of how and when to start and stop the plant, the operator should be carefully instructed and given a copy of the instructions forwarded with the machine. These instructions should be read, discussed and tried by both operator and engineer and, when accepted, become the standard procedure by which operating is performed. Accurate measurement of performance under standard conditions can then be obtained and the results of any alteration to procedure is measurable.

The operator can be of immeasurable assistance to the engineer by reporting minor anomalies which, if unattended, become chronic.

In such cases where the opera-

tor's duties border on the engineering, there should be a clear understanding of where he finishes and where the engineer starts. The shifting spanner, screwdriver and hammer have their uses in the factory, but, when misused, can result in production losses.

In a cannery it often happens that misunderstanding exists between operator and engineer. The operator, in his desire to obtain maximum production, does so at the expense of the plant, much to the annoyance of the engineer. As both these people are working to the one end, an understanding and appreciation of the part each must play in obtaining maximum efficiency is necessary.

My personal experience with operators has been such that I am certain that any time spent in instruction and direction will be repaid many times in improved efficiency and lowered maintenance costs.

Maintenance and service

Lubrication is possibly the simplest and yet most effective item of maintenance and, if methodically applied, will result in reduced costs.

Routine maintenance and plant service must be done at regular and predetermined periods. Schedules and logs should be compiled and form the basis for performing this work. In such cases where expendable parts require replacement during a manufacturing programme, a safe operating period should be determined for the particular part, and, on this basis, the part replaced during a production break.

The use of gauges and other measuring aids will tend to eliminate the human factor in machine setting and adjusting, and provide for measurable standard performance.

Any programme will depend to a degree upon the skill and experience of the engineers and mechanics who perform the physical functions, and, to obtain the maximum from the skill and experience available, it is necessary to have a sound operating policy and efficient supervision.

The canning industry, of economic necessity, is highly mechanised. This is a challenge to the engineer to obtain maximum operating efficiency from his plant. His success will determine the production efficiency of the cannery.

Preventive maintenance is a "must" in a cannery, if efficient plant operation is to result.

The above paper was read at the Sixth Australian Canning Convention.

Compound Milling

THE large-scale production of balanced rations for the successful feeding of livestock demands a knowledge on the part of the compound and provender miller of:

1. the nutritional requirements of different classes of livestock when fed for various purposes and at various stages of growth;
2. the nutrient composition and dietary value of raw materials suitable for use in the ration;

and

3. the means whereby raw materials alone and in mixtures can be handled and suitably processed.

The compound miller's knowledge of items (1) and (2) should enable him to formulate rations which are suitably balanced in major ingredients and in vitamins and minerals for specific purposes, while the extent of his knowledge of item (3) should be such that he can convert either an individual feedingstuff or a specially formulated blend into a form which will be well-liked, well-digested and well-absorbed by the animal or bird. Mr. Simmons' book* is concerned mainly with this last aspect of the science of compound milling, although it does contain a contributed chapter—and the longest chapter of the book—which is devoted to item (2). The important subject of the nutritional requirements of various types of livestock and the formulation of blends is, however, dealt with very sketchily, being discussed in about eight pages. This is a pity; if in a second edition Mr. Simmons were to give this aspect of the subject the attention it needs his book will not only become much better balanced but also of greater value as a practical guide.

Section 2 of the book which deals with plant and processing and which accounts for about 85% of the text is wide in its scope, covering the whole of the practice of compound and provender milling from the intake and storage of raw materials to the weighing, packing and storage of finished products. It reviews in detail and with a wealth of illustrations, which include photographs and line drawings, the plant and processes involved in weighing, cleaning, conveying, exhausting, conditioning, drying, grinding, mixing, blending, cubing, pelleting and flaking. The illustrations include 18 flow sheets presenting the sequence of operations involved in specific manufacturing processes.

Clear exposition

The text is well written and clearly explains the construction and method of operation of the various machines, an object not always easy of attainment, but Mr. Simmons has had the advantage of serving for many years as a technical member of the staff of a firm of milling engineers which manufactures many of the machines used for compound and provender milling. Errors and misprints are few, although there are some inconsistencies in the founts used for sub-headings and a few incorrect textual references to figure numbers. These defects, although perhaps slightly annoying, are only minor blemishes and do not seriously detract from the value of the book as a tutorial manual for the student and a practical reference book and guide for the compound and provender miller.

A. J. AMOS

* *Compound Milling and Associated Subjects.* By N. Owen Simmons. Pp. 279+xix with 197 illustrations. Published by Leonard Hill Limited, 9 Eden Street, London, N.W.1. 42s. net.

FRUIT: World Trade at Record Level

THE continued expansion of world fruit production, together with some easing of trade restrictions, has brought world exports of fruit, both fresh and processed, above the pre-war level. The Commonwealth Economic Committee's annual review "Fruit"* shows that exports of fresh fruit in 1953, totalling nearly 6¾ million tons, were easily the heaviest ever recorded. Commonwealth exports of fresh fruit, although lower than pre-war, owing to reduced shipments of apples and bananas, were much greater than in other post-war years. Exports of canned and dried fruits and fruit juices from Commonwealth sources also rose considerably and were largely responsible for the greater international trade in these commodities.

U.K. imports of fresh, canned and dried fruits and fruit juices in 1953 were in each case the highest since the war. A notable feature was the increased contribution of Commonwealth countries, which provided nearly 95% of the total imports of canned fruits preserved in syrup, 65% of fruit juices, 50% of fresh fruit and 40% of dried vine fruits.

Fruit production in the U.K. has risen to more than twice the pre-war level. Fruit consumption in 1953, including processed fruits in terms of fresh fruit, was equivalent to 115 lb. per head of the population, of which over 60% was consumed fresh. While this was 5 lb. higher than the average of recent years, it was about 9 lb. less than before the war and less than in the U.S., Canada and Australia. The available supplies in the U.S. in 1953 represented a *per caput* consumption of 193 lb., while those for Canada and Australia were equivalent to 168 lb. and 133 lb. respectively.

Fresh fruit

The further expansion in world exports of fresh fruit in 1953 can be attributed largely to increasing production in both Commonwealth and foreign countries and to the greater measure of trade liberalisation in Western European countries, which are important both as exporters and importers. The world output of citrus (of which oranges account for nearly 80%) is now over half as much again as at the beginning of the war. While the increase for deciduous fruits generally is not so great, there have been important developments, particularly in the production of table apples and pears in Europe.

Canned fruit

World exports of canned fruit in 1953 were the largest in post-war years and under 15% less than in 1938, even though exports from the U.S., the leading pre-war supplier, were still greatly reduced. Shipments from Australia and South Africa were exceptionally heavy and, with increased exports from Malaya and other Commonwealth sources, the Commonwealth provided nearly half of the total quantity entering international trade. Although the U.K. took more from the Commonwealth in 1953, its total receipts were little more than half those of 1938.

Fruit juices

Fruit juice production has continued to expand, particularly in the U.S. In comparison, the output of Commonwealth countries is small, but they are important exporters and in 1953 provided approximately one-quarter of the supplies entering international trade. Most of these Commonwealth supplies are consigned to the U.K., the main sources being the British West Indies, South Africa and Australia. Canada, the leading importer of fruit juices, takes the bulk of its growing supplies from the U.S.

Dried fruits

The world pack of dried vine fruits was again fairly heavy in 1953. The smaller output of raisins in the U.S. was largely offset by a record pack in Australia and above average packs in most other countries, including South Africa and Cyprus. The output of currants in Australia was also heavier than in recent years. World exports of raisins and currants were the highest in post-war years. Exceptionally heavy exports of raisins from Australia, Greece and Persia were partly offset by reduced shipments from the U.S. and Turkey. Imports into the U.K., the leading market, were easily the heaviest since the war and about 20% greater than in 1938.

Wine

The estimated output of wine in 1953 was the highest for many years. U.K. imports, of which Commonwealth sources (mainly South Africa and Australia) provided nearly one-quarter, were larger than in 1952 but only about the average of recent years and much smaller than before the war.

* "Fruit, 1954." Price 5s. net (5s. 4d. post free), obtainable from H.M.S.O.

Food Oils

(*Concluded from page 158*)

British West African territories were terminated, by mutual agreement; the contracts for copra and coconut oil from New Guinea and Papua, Fiji and other British Pacific Islands, however, remained in force. Canada, Australia and Pakistan are now the only other net importers of more than minor significance; South Africa's imports have fallen sharply, while exports have increased, following the considerable expansion in its own output of oilseeds, especially groundnuts.

The report contains detailed statistical appendices showing the annual available supplies of vegetable oils in some important consuming countries, the production of soap, margarine and compound cooking fat, with the utilisation of oils and fats in these commodities, a section on whale oil production, trade and prices and a new appendix on import duties in the U.K., Canada, U.S., France, Western Germany and Benelux.

Advances in Food Technology

SAUSAGES

Aerosol Improves Processing

During the preparation of salami and similar sausages, it is essential to prevent unduly rapid drying of the surface layers, which might prevent the proper drying of the core and lead to core rot. Tests carried out at the Institute for Food Technology and Milk Hygiene at the Veterinary College, Hanover, show that it is possible to avoid this danger by using a special hygrometer-controlled aerosol air moistening apparatus which keeps the humidity of the store room within predetermined limits.—F. Schönberg, *Die Fleischwirtschaft*, 1954, **6** (11), 454.

CANNED HAM

Excessive Juiciness

Excessive juiciness of pasteurised canned ham is a frequently encountered defect which lowers the quality of the product. The causes of this defect have been studied in Poland, notably by Prof. S. Koeppe, who found that the phenomenon is not directly related to the total water contents of the ham, but rather to the fact that certain muscles contained in the ham have a greater tendency to exude than others. The fault can be partly remedied by procuring a more uniform distribution of the pickling salts in the tissues. This can be achieved if the material immersed in the pickle is subjected to pressure for a few hours.—F. Spanzaro (*La Révue de la Conserve de France et de l'Union Française*, 1954, **9**, 83).

POTATO STORAGE

Effect of Heaping Height

In the autumn of 1952, a cold storage hall for potato heaps of over 26 ft. height was taken into use at Bochum, Germany. One half of the hall was used for bulk potatoes, the other for sacks of potatoes. It was found that the potatoes, which were selected for quality and size and stored immediately after lifting, were still in excellent condition when they were removed in May and June of the following year. Certain varieties (Bona, Sabina) were found to be better suited for massed cold storage than others (Magna). The loss percentage was below 4%. Boiling properties and taste were exactly the same as for fresh potatoes. Damage obviously attributable to compression was only found with potatoes which had been stored within 1 ft. of the ground. The percentage of solids showed a slight tendency to decrease. Starch and sugar contents showed a clear reciprocal relationship. There was only a very small decrease in the contents of ascorbic acid.—L. Nicolaisen-Scupin and N. Nicolaisen, *Kältetechnik*, 1954 (11 and 12).

FOOD COLOURS

Synthetic Carotene

The Deutsche Hoffmann-La Roche Co. has found an economic method for synthesising carotene. It is based on the use of β-C_{14} aldehyde, an intermediate product of vitamin A synthesis, which is first converted to β-C_{19} aldehyde through condensation with 1-methoxy-2-oxy-2-methylbutin, and subsequently converted to β-carotene ($C_{40}H_{56}$) through condensation with acetylene di-magnesium bromide. The synthetic product is said to have the same chemical, physical and biological properties as the natural product but is purer than the latter. Tests with synthetic β-carotene as colouring matter for butter and margarine have been completely satisfactory. — W. Schuchardt, *Fette, Seifen, Anstrichmittel*, 1954, **56**, 986.

CHOCOLATE

Determination of Fat Admixtures

A method has been developed at the Munich Institute for Food Technology and Packing, for the detection of foreign fat admixtures in chocolate, etc. The fatty components of dark chocolates are extracted and fractionated three times with acetone at −12°C. The glyceride fractions are analysed for acidity, saponification, neutralisation, iodine value, difference in solubility and aniline point. The juxtaposition of these values permits the detection of foreign fat admixtures amounting to 5% or more though, in some cases, final proof must be obtained by optical methods.—A. Purr, *Fette, Seifen, Anstrichmittel*, 1954, **56**, 823.

ANTIOXIDANTS

Soya Bean Derivative

An antioxidant, known as *Nurupan*, is being used in Germany. It is produced from pure soya flour extracted from selected ripe soya beans from which bitter substances have been removed by means of a patented heat treatment which does not damage the antioxidant properties and which, at the same time, improves the digestibility and nutritional value of the soya protein. The product is rich in provitamin A and vitamins B, D, E, F and K. Milk powder containing 2-5% of the new antioxidant is said to have kept three times as long as untreated milk powder without noticeable deterioration in taste or freshness. Confectionery can be protected against saponification of the fat contents by means of a 3% addition of the soya antioxidant which itself has a pleasant taste. The product has also been found valuable for wafers, biscuits, etc., and ice cream.—H. Schade, *Fette, Seifen, Anstrichmittel*, 1954, **56**, 1011.

MILK AND BUTTER

Vitamin A Contents

The vitamin A content of milk and butter are subject to seasonal as well as local fluctuations. Research work, extending over several years, has been carried out by the Swedish Institute of Health on the vitamin A and carotene contents of milk and butter obtained from different regions of the country and at different times of the year. Generally speaking, the vitamin contents of winter and summer products were found to be in the proportion of 2 to 3. The butter with the highest vitamin contents came from Southern Sweden.

Carotene is now regarded as provitamin A, and its preservation therefore becomes a matter of importance. Recent Scandinavian research seems to indicate that the carotene content of cattle fodder plants (and hence of milk and butter) depends not only on the nature and age of the plant growth substances, but also on the incidence of daylight which varies greatly throughout the Scandinavian peninsula.—E. Akerberg and V. Hellström, *Livsmedelsteknik*, Nov., 1954.

MEAT PACKAGING

Tests of Wrapping Materials

The Finnish Research Institute of Co-operative Slaughterhouses has carried out research on the influence of three different packing materials (polythene, *Pliofilm* and *Cellophane*) on the weight, bacteria growth and general organoleptic quality of the packaged meat products. Weight losses in polythene wrappings were hardly noticeable, those in *Pliofilm* small, but those in *Cellophane* appreciable under unfavourable circumstances. Aerobic bacteria showed a vigorous growth in polythene wrappings, less so in *Pliofilm*, and least in *Cellophane*, whilst the order was reversed in the case of anaerobic bacteria. These phenomena are attributed to the different rates of oxygen permeability. Organoleptically, the products packed in *Pliofilm* were best able to keep their colour, flavour and taste; polythene came second, and *Cellophane* third.—F. P. Niinivaara and J. Korhonen, *Die Fleischwirtschaft*, 1955, **7**, 65.

CONFECTIONERY

Sorbitol Preservative and Sweetener

In keeping with recent American practice, some German manufacturers are now using sorbitol (hexahydric alcohol derived from dextrose) as a preservative, freshener and softener for candies. Whilst the sweetening power of sorbitol products is similar to that of dextrose, they have a particularly pleasant cool taste and, being non-volatile, are proof against boiling and baking. Their calorific value is nearly as high as that of dextrose and is completely absorbed by the organism. Owing to its moisture retention property, sorbitol is specially suitable as a softener. Sorbitol products have been used in the manufacture of soft caramels, fondants, cream fillings, wine gums, candies, marshmallows, marzipan, nougats, fillings and sugar coatings.—Dr. G. Graefe, *Gordian*, 1955, **54**, No. 1301, 16.

CANNED FOODS

Thickening Agents

The properties of pastes made from wheat flour, corn starch, waxy rice flour, waxy corn starch, waxy corn flour, and waxy sorghum flour have been investigated with particular reference to the utility of these materials as thickening agents for canned food products. The results show that pastes made from the waxy cereal thickenings and from mixtures of non-waxy and waxy thickenings are considerably more stable during storage than pastes made from wheat flour or corn-starch alone. The effect of storage on the properties of a series of thickened carrot soups indicates that the results obtained from the simple paste preparations are applicable to food products which do not contain large amounts of naturally-occurring thickening materials.—J. G. Davies, J. H. Anderson and H. L. Hanson, *Food Tech.*, 1955, (1), 13.

Elements of Food Engineering

THIS book treats, in three volumes, the production, preparation, processing, handling and distribution of foods from the unit operation and unit process points of view.

The first volume outlined the engineering factors involved in food processing and described in detail the agricultural and nutritional aspects of food production, the extent of the food processing industries, major classifications of foods and refined foods processing. The second and third volumes,* now available, present a unified, coordinated discussion of unit operations grouped systematically into sections according to their specific functions.

Volume 2 covers assembly of raw materials, including materials handling, harvesting, transporting, receiving, separating, grading, and engineering aspects of materials handling. Such operations involved in raw materials preparation as cleaning, separating, disintegrating and pumping are dealt with, and the volume concludes with a discussion of such aspects of raw material conversion as mixing, heating and refrigeration.

The third volume continues the discussion of raw material conversion, covering evaporation and distillation, dehydration and drying, and controlling. The final section deals fully with the treatment of final products, including chapters on coating, decorating and forming, and packaging materials and methods. Packaging of solid and liquid foods, packaging machinery, testing of packages and materials, and quality control in food packaging are also covered.

The production standard of each volume is good and the many diagrams and photographs have been clearly reproduced. The usefulness of this important work is enhanced by the fact that each volume has its own subject index.

* *Elements of Food Engineering*. By M. E. Parker, E. H. Harvey and E. S. Stateler. Vol. 2, 68s. net; Vol. 3, 54s. net. New York: Reinhold; London: Chapman and Hall.

Machinery and Equipment

Sealed weighing machine

A weighing machine that can be "hosed down" after use without damaging the working parts has been produced by Swift and Swallow Ltd. All joints of the machine, which is known as the Swift "sealed scale," are fully sealed by a mastic composition and the internal floating mechanism is fully protected by a special method of oil sealing, the oil being visible in wells at both ends of the scale. The value of this to certain processors is obvious.

Where fish has to be prepacked, possibly outside in all weathers, it is claimed that neither the fish nor the weather can affect the operation of the scale, ensuring continuous smooth working. Where conveyor belt methods are used, of course, this is particularly important.

Similarly, with fruit packing, where the moist and acid character of the fruit might easily affect an ordinary weighing machine, trouble can be avoided by use of the "sealed scale" which the juice cannot penetrate. The manufacturers state that nothing can get into this scale—neither the particles from goods of a floury or powdery nature, that can clog up normal machinery, nor the corrosive vapours generated by some processes, which eat into equipment. For this reason it has already found favour in factories and pre-packing stations where it is said to give much longer periods of trouble-free service than a normal scale could possibly provide.

The scale can be supplied with 14 lb. or 20 lb. capacity, with fittings in stainless steel to meet various requirements. An 8 oz. chart in ¼ oz. divisions ⅛ in. apart, graduated on both sides "light" and "heavy" is normally supplied for factory use but other charts are available.

•

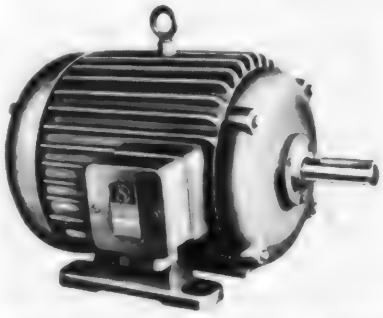
Continuous wine press

A continuous wine press (with single bronze screw 430 mm. diam.), claimed to treat about 100 metric quintals of pressed grapes per hour without breaking the material in treatment or causing alteration of flavour, has been introduced in Italy by Agenzia Enologica Italiana.

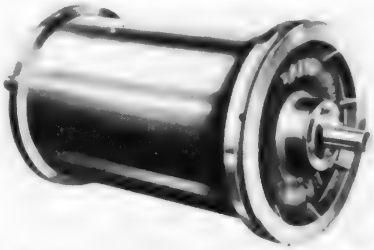
The *Sursum* press, as it is called, incorporates a new feeding system with driven and synchronised jaws that grasp the mass to be treated and rhythmically push it into the cage. The short screw causes a rectilinear pressure on the material, similar to that of the hydraulic presses, without any rubbing; the discharge of the liquid through a central tube and the perforated cage improves the extracting operation. A new circular-iris system regulates the pressure by varying the outlet diameter and is actuated by an external lever. Speed changes are rapidly obtained by substituting pulley couples; this enables the operator to adapt the machine to the type of work in hand. The variable inclination in the *Sursum* press puts the pressed mass in the best position for direct loading into the cages of the final hydraulic presses.

This machine can be used in white or red wine production, in muscatel making and to press fermented dregs.

Fourteen pound light heavy "sealed scale" fitted with stainless steel goods plate.



Surface cooled motor, one of a series ranging from 1½ to 10 h.p.



"Rapid" magnetic drum, suitable for installation at the discharge end of spouts, chutes, bucket elevators, etc.

•

Magnetic separators

Rapid Magnetic Machines Ltd. will again be exhibiting a representative cross-section of their permanent and electro-magnetic equipment at the 1955 B.I.F.

An addition to their already extensive range of swarf separators will be exhibited, also the well-tried multi separator for treating the more complex swarf, scrap, etc.

Another new exhibit, on this occasion an addition to the company's range of mineral separators, will be the induced roll for the purification and concentration of dry, granular, free flowing, feebly magnetic material.

Units in the company's range of permanent equipment will also be available for inspection and include the Magnahump and Magnatrap, which are for inclusion in gravity, pneumatic or hydraulic ducts, pipelines, etc., and are essential where tramp iron is to be removed from liquid, semi-liquid, or dry fibrous products.

Electro-magnetic chute-type separators will be shown as will the company's type "V" separator which is a vibratory machine designed to treat fine powders and other commodities of similar consistency, that require mechanical motion to precipitate flow.

•

Surface cooled motor

Small Electric Motors Ltd. have increased their range of industrial 3-phase motors with the addition of a new surface cooled motor. With a range of 1½ to 10 h.p. inclusive, and a speed of 1420 r.p.m., it is fitted with motors of the 3-phase totally enclosed fan cooled type developed to meet the increasing demand for motors with standard dimensions as laid down by British Standards Specification 2083. Its main features are its very accessible terminal box, efficient cooling system, heavy duty bearings, high electrical efficiency, ample starting torque, continuous rating at full load, indestructible rotor, and its compact, robust construction and clean design.

Further information on the machinery and equipment described can be obtained by writing to the

Enquiry Bureau,
FOOD MANUFACTURE,
9 Eden Street,
London, N.W.1.

Mobile lorry loader

A new mobile mechanical skid lorry-loader has been developed by Powell and Co., manufacturers of drum, barrel, bin, and carboy handling equipment. Known as the *Skid-Master*, types SML/1, SML/2, the loader is hand operated, a crank handle being suitably placed so as to drive the hoisting drum *via* roller chain and pinions. The load can be held in any position during loading by means of a ratchet and pawl. Two large diameter wheels are fitted so that the machine can be easily moved. Handle removable-brackets are provided on the side of the frame to carry the handle when the skid is being moved or stored.

With the type SML/1 skid, one man can lift 4½ cwt. to 4 ft. 6 in., 5 cwt. to 4 ft., and 5½ cwt. to 3 ft. 6 in. With the type SML/2, which is designed for heavier loads, up to about 7 cwt., two men, with separate crank handles on opposite sides of the machine, are required.

*

Food engineers absorbed by parent company

G. C. Engineering Co., Ltd., Grinstead Road, Deptford, S.E.8, a wholly-owned subsidiary of Fredk. Braby and Co., Ltd., has for many years been trading as a separate entity, manufacturing and selling under its own name food processing and can-handling plant, elevators and conveyers, etc., for the canning and associated industries.

Fredk. Braby and Co., Ltd., has recently erected a large modern factory at Crayford, Kent, and in order to take full advantage of the greatly improved facilities in production methods and co-ordination now available to the group, it has been decided to end the activities of G. C. Engineering Co., Ltd., as a separate entity. G. C. Engineering Co. is, therefore, being placed in voluntary liquidation by way of a Members Voluntary Winding-up. The manufacturing and selling activities of the company will be continued with the same staff, as a department of the parent company under the title of Fredk. Braby and Co., Ltd., G. C. Engineering Works Division, London Works, Thames Road, Crayford, Kent.

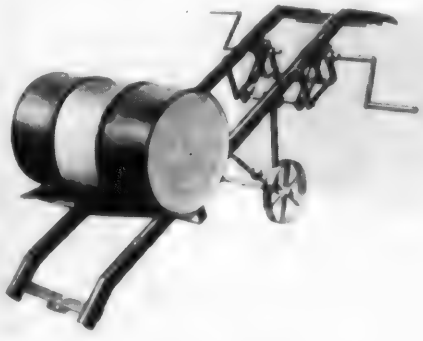
The range of over 70 different products displayed by Cinema-Television Ltd., at the Packaging Exhibition, all of which had passed through a "Cintel" metal detector during the course of manufacture. The photograph shows the wide range of manufacturers now using this equipment.

*

Glass pipeline for distilleries

Reconstruction of the Edinburgh warehouse of W. and A. Gilbey Ltd. included installation of a new fast line for bottling Spey Royal Whisky under bond for America and Q.V.F. Ltd. put in the first large installation of glass pipeline for the distillery.

Another Q.V.F. installation of pipeline is taking place at the new bottling plant of the White Horse distillery at Port Dundas, Glasgow, where the pipeline is used to carry whisky to the bottling plant, and at the premises of Hiram Walker and Co. Ltd., at Ballentyne's distillery, Dumbarton.



Type SML/2 "Skid-Master" lorry loader. Fitted with two crank handles, this model has a lifting capacity of up to 7 cwt.

More U.S. food machinery to be made in Britain

An agreement has been signed by Chisholm Ryder Co. Inc. of U.S.A. and Frederick C. Kane Ltd. of London to manufacture in this country a wider range of the former company's food processing machinery.

Mr. E. McKinley, Chisholm Ryder's sales executive responsible for their overseas operations, and Mr. Frederick C. Kane, managing director of the British firm, were responsible for concluding these arrangements. Mr. McKinley has left the country after a tour of British and Irish food factories. He said that plans had been made for Kane to construct a new "mobil-viner" for pea-growers, which was now entering its final stages of testing, and would be on view to British growers for the first time "somewhere in the Home Counties" this picking season.

One of these machines had a capacity of more than two stationary viners.

British bean-growers could also have the new C.R.C.O. bean picker which mechanically harvested beans at the rate of 1 acre/hr., and did the work of many hand pickers.

Before leaving this country Mr. McKinley also said that he had discovered some items of British equipment which would be of interest to American food processors, and he was arranging for these to be exported. One such British machine would be exhibited at the American Packaging Show.

News Digest

Food Trades Give Work to 2½ Million

FEDERATION PRESIDENT AT N.W. MANUFACTURERS' DINNER

The importance of the contribution of the food trades to the economy of the nation was stressed by Mr. Colin S. Dence, president of the Food Manufacturers' Federation, at the annual dinner of the North Western Food Manufacturers' Association at Blundellsands Hotel, Crosby, on March 2.

Mr. Dence said it was not realised how vast had become the food manufacturing industry, nor that 32% of the incomes in this country were spent on food in one form or another. Taking all trades engaged in food production and distribution, whether in farming or the manufacturing industries, employment was found for about 2,500,000 people. The food industry was, therefore, one of the largest and most important in the country. In the year 1953-54, about £78 million was spent on bacon and sausages and about £55 million on biscuits, but the figure of which he was particularly proud was that relating to food exports. One read a lot in the newspapers about motor car exports running to £100 million a year, but the value of food and drink exported reached the astonishing total of £125 million. That meant that about one-fifth or one-quarter of the food and drink produced in this country was exported.

Food manufacturers had had problems in plenty, not the least important of which were those connected with supplies when prices were rising. However, manufacturers were determined to maintain the quality of their products at all costs.

Mr. Colin S. Dence.

One of the good things that came out of the war was that it brought manufacturers closer together. Before that they had very little contact and evils of price cutting were rife. The friendliness which now found expression among food manufacturers in general was a good augury for the future. Mr. Dence congratulated the North Western Manufacturers' Association, which was an autonomous body, for the contribution it had made to the solution of food trade difficulties.

More chilled beef from the Argentine

Señor Carlos Hogan, Argentine Minister of Agriculture, said in London recently that he expected that within a year about 90% of Argentine beef exported to Britain would be chilled and not frozen. He added that he thought Argentina could supply the U.K. with all the beef she needed. Señor Hogan, who was visiting Britain to study methods of increasing agricultural productivity, said that Argentine meat producers welcomed the end of British bulk buying. It had completed the agreements only with the greatest difficulty as there had always been better prices obtainable in other markets.

Best quality chilled Argentine beef fetched prices only slightly below best Scottish beef in the open market in Britain. Meat of a similar quality frozen and bought under bulk purchase might fetch a shilling a pound less, he said.

More join Nutrition Panel

Membership of the Nutrition Panel, Food Group, Society of Chemical Industry, continues to grow. On January 1, 1953, membership was 420, on January 1, 1954, 460, and on January 1, 1955, it reached the record figure of 494.

The programme for next session is well in hand and the theme covering all meetings will be "Nutritional Requirements and Food Fortification."

Increased British tinplate production

The British Iron and Steel Board have announced plans to increase Britain's tinplate production by over half a million tons per year in the next four years. In a report, "Development of the Iron and Steel Industry 1953 to 1958," which was laid before Parliament at the end of February, the Board state that the programme aims at increasing the overall production capacity of the industry from last year's output of 18·5 million ingot tons of steel to 22 million tons by 1958. Britain's tinplate capacity will be raised by 85%.

"Home canners and other users of tinplate were in 1953 taking 515,000 tons a year of tinplate compared with 375,000 tons before the war," the report says. "A further growth in the demand for tinplate at home is forecast, and fresh uses for containers made of tinplate are expected to develop when adequate supplies are available. Exports also might be expanded considerably, especially to Commonwealth markets, which are at present partly supplied from the U.S. An estimate of demand in 1958 has been prepared in collaboration with the principal users and makers of tinplate. This shows a prospective requirement of 1·36 million tons. The estimate for home demand represents an increase of nearly 100% over the average deliveries to the home market in 1936-39."

Milk powder company acquired

The Scottish Milk Powder Co. Ltd., which has carried on a successful business as manufacturers of milk and whey powders at Mauchline and Kirkcudbright for the past 20 years, has sold its factories, plant and equipment to the Scottish Milk Marketing Board. These factories, which adjoined creameries already operated by the board, will be carried on under the supervision of Mr. W. B. Barbour, who has been a director of the Powder Company since its inception. The take-over date was March 1, 1955.

Management of small firms

The third "Small Firms" Conference to be organised by the British Institute of Management, with the support of the Federation of British Industries and the National Union of Manufacturers, will take place at Harrogate from April 29 to 30.

Mechanisation of the kipper industry

The efforts to introduce mechanisation into kippering industry practice have had relatively limited acceptance despite the contention by research experts that controlled smoking provides a more consistently satisfactory product. Torry Research Station led the way in devising, building and marketing a controlled smoking kiln. Now to settle divergent views on the subject and to satisfy those who hold that the traditional kippering kiln is the superior method, Torry is to carry out research work on smoking, analysing the smoke used to determine what features in the smoke are mainly responsible for the flavour and keeping quality of the kipper. Reporting this at an Aberdeen meeting Dr. G. A. Reay mentioned current work to find a simple quick method of evaluating fish freshness. One method which had been adopted was to excite the lenses of the eyes of the fish, matching their opacity with standard opaque beads. The longer the fish were on ice, the more opaque the lenses. And duration of icing could be estimated to within a day and a half. The real solution to this question is to freeze and store at sea, and here again Torry are actively engaged on practical work. The known antipathy to frozen fish arose from less perfect methods in use in the past, mainly through failure to use low enough temperatures. Given good fresh palatable frozen fish, the prejudice against frozen fish would pass, the speaker claimed.

New Irish biscuit factory

Famor Food Products, a company formed in 1950, has opened a new factory at Santry, Co. Dublin, and will engage mainly in the manufacture of biscuits.

The company was formed by Messrs. A. A. Morrissey and J. F. Maher, directors and shareholders, who hold the entire capital jointly. A subsidiary company is in operation in London. The factory was planned four years ago and in 1952 the delivery of the first portion of the plant was made and two years later a steel baking oven manufactured in Holland was installed. The plant is the most modern of its kind in Europe.

Capital expenditure has exceeded £100,000 and no assistance was asked of the Irish Government. Production began last July and has increased rapidly since the beginning of this year. Biscuits now being made daily total one million. Export orders have been received from the Continent and East Africa in competition with leading cross-channel manufacturers.

There are 30 acres of freehold land at the disposal of the company in Santry and it is planned to extend the present premises.

OBITER DICTA

● The bread I bought must have been little more than a sterilised vehicle for carrying other foods to the stomach.—*Letter to "Manchester Guardian."*

● Whatever the fish the cost to the fried fish proprietor is much affected by the way he slices the portions. He knows that a fried rhombus looks larger than a fried rectangle, and that batter is bulky as well as nourishing.—*"The Economist."*

● No supply of physical (external) energy from any source can be a substitute for having something suitable to put between your teeth—at meals and similar occasions which must seem vulgar to a nuclear physicist.—*Professor Hugh Nicol.*

● He is evidently a bacteriologist, as opposed to a microbiologist, which is a more sophisticated word for the same thing. Microbiologists shuffle papers, and never look through a microscope unless it cost over twenty-two hundred dollars. — *"The New Yorker."*

● The grey fuzz which alarmed a village in New York state when it fell mysteriously from the skies was said to be radioactive cotton waste. Today scientists identified it as powdered milk from the chimney of a local dairy.—*"The Times."*

● Section 3 of the Act defines "docking" as the deliberate removal of any bone or any part of a bone from the tail of a horse, and the expression "docked" is to be construed accordingly. "Horse" includes stallion, gelding, colt, mare, filly, pony, mule and hinny. — *Ministry of Agriculture press notice.*

● Butter now is almost all factory made, everything is sterilised and far too scrupulously cleaned; the small good little uncleanlinesses which made farmhouse butter so delicious, now are absent, and I think that modern butter is about equal with *Vaseline* in taste. — *Dr. A. T. Todd in his book "Good Living."*

Imports of dried peaches and prunes from U.S.A.

The Board of Trade announce that arrangements have been made for the import under specific licence of a limited quantity of dried peaches and prunes from the U.S.A., to be purchased with dollars made available under the U.S. Mutual Security Act, 1954 (Public Law 665).

Import licences will be issued to first hand distributors or their nominees under arrangements similar to those used for the import of prunes from the U.S.A. under the Mutual Security Act during the first half of 1954 (Notice to Importers No. 622).

The Ministry of Food will notify each first hand distributor: (*a*) of his allocations separately for (i) dried peaches and (ii) prunes; (*b*) of details of the documentation procedure required for imports under the U.S.A. Mutual Security Act; and (*c*) how to apply for an import licence.

Separate licences will be issued for dried peaches and prunes, valid for imports to August 31, 1955.

Pests rob 150 million people of food

An exhibition, "You Versus Pests," promoted by the Royal Sanitary Institute in conjunction with the Ministry of Agriculture and Fisheries, was opened recently by the Rt. Hon. D. Heathcoat Amory, M.P., Minister of Agriculture and Fisheries and of Food. A statement by F.A.O., displayed at the exhibition, said that world loss of breadgrains and rice through pests in 1947 was about 33 million tons, almost equal to the total amount of food moving in world trade. It would feed 150 million people for a year, said the announcement, which added soberly: "World grain supplies are lower than in 1938 but the population has increased since then by 200 million."

On display were some thousands of important insects, including a variety of live specimens, which cause immense damage both to the nation's large imports of stored food and to health. Many of the insects shown were kept alive by the most up-to-date scientific methods, which necessitated elaborate feeding arrangements.

Apart from showing the insects at work and the resultant damage to the country's food supplies and health, the exhibition also indicated some of the most successful methods of prevention and control. In addition, there was a pictorial account of the steps being taken by the Ministry of Agriculture (Infestation Control Division), to inspect all imported stored goods, not only on their arrival in the U.K., but during their transit and storage here.

It was emphasised that, whether dealing with bulk storage in factories or food in the home, cleanliness still continues to be the most important weapon in preventing attacks by insects.

Arsenic in Foods: New Recommendations

The Minister of Food has approved for publication a revised report presented to the Food Standards Committee by their Metallic Contamination Sub-Committee recommending the introduction of limits for arsenic in foods.

Earlier reports on this subject by the sub-committee were published in February, 1950, and September, 1951. Since then the sub-committee have reviewed the representations received from trade and other interests and the revised report replaces the earlier reports.

Article of Food	*Limits recommended in parts per million by weight*	
	Arsenic (As)	Arsenious Oxide (As_2O_3)
(i) *Beverages*		
Cider	0·2	0·26
Black beer	0·5	0·66
Soft drinks intended for consumption after dilution, concentrates used in the manufacture of soft drinks and undiluted fruit juices	0·5	0·66
(ii) *Other Foods*		
Ice cream, iced lollies and similar frozen confections	0·5	0·66
Dehydrated onions	2·0	2·6
Dried hops		
Dried liquorice extract		
Edible gelatin (already prescribed)		
Liquid pectin		
Chemicals (other than chalk) used as ingredients or in the preparation or processing of foods		
Chalk (creta)	4·0	5·3
Chicory—dried or roasted	4·0	5·3
Dried herbs	5·0	6·6
Finings and clearing agents		
Hop concentrates		
Solid pectin—all grades		
Spices		
Food colourings other than synthetic colourings	5·0 on dry *colouring* matter	6·6 on dry *colouring* matter

It recommends that statutory effect should be given to the limits now proposed and that any statutory limit prescribed should be subject to periodical review.

The Food Standards Committee have adopted the report of their sub-committee, but before taking any action on it the Minister of Food is willing to consider any further representations which interested parties may wish to make. They should be addressed to the Assistant Secretary, Food Standards and Hygiene Division, Ministry of Food, Great Westminster House, Horseferry Road, London, S.W.1, and they should be lodged not later than May 31 next. Copies of the report may be obtained from H.M.S.O., York House, Kingsway, London, W.C.2, or from any bookseller (price 4d. net).

The sub-committee have proposed the lowest limits which they consider can at present be readily attained under conditions of good commercial practice. They confirm the appropriateness of the general limits previously recommended, *i.e.*, 0·1 parts per million arsenic for beverages ready-to-drink and 1 p.p.m. for other foods. These limits are substantially the same as those recommended by the Royal Commission on Arsenic in 1903. On the other hand the sub-committee's original enquiries, and subsequent representations, have drawn attention to articles of food and drink to which these general limits could not at present be applied, principally concentrated foods and substances in the nature of food adjuncts which only enter into the diet in small quantities.

The sub-committee are of the opinion that it should be possible in due course to reduce the limits proposed for certain specified foods. The foods and drinks which cannot be brought within the general limits, or which can be subjected to lower limits, and the limits recommended in each case, are as shown above.

So far as fresh or processed crustacea, shell or other sea-food in which arsenic may occur naturally in amounts higher than 1 p.p.m. are concerned, the sub-committee recommend that the sale of these foods containing arsenic in excess of 1 p.p.m. be permitted if it can be shown that the arsenic is natural to them.

Wall's chairman visits U.S.

Mr. Cecil W. Rodd, chairman of T. Wall and Sons, Ltd., has left for a visit to the U.S. during which he will stop at New York, Chicago and Los Angeles. He is particularly interested in the U.S. ice cream industry.

Erections and Extensions

A new £40,000 factory is being erected on the Industrial Estate at Crawley New Town, Sussex, for **Cow and Gate, Ltd.**, infants' food manufacturers.

▪

New sugar silos are under construction at York for the **British Sugar Corporation, Ltd.**

▪

Macfarlane, Lang and Co., Ltd., biscuit manufacturers, propose the early expansion of their factory at Clydeford Drive, Glasgow, at an estimated cost of £90,000.

▪

H. A. Warfield and Son, potato crisp manufacturers, of Bristol, have plans for the construction of a new factory on 1,000 sq. yd. of land at Fishponds Trading Estate, Bristol.

▪

Messrs. Thomsons, mineral water manufacturers, Albert Street, Barrow-in-Furness, Lancs, are planning to erect a new factory on a site at the Strand and Albert Street, Barrow-in-Furness.

▪

Weston Biscuit Co., Ltd., have had plans approved for the construction of a new factory on Sighthill Industrial Estate, Edinburgh.

▪

T. Wall and Sons, Ltd., ice cream, pie and sausage makers, Acton, London, W.3, are having a new distribution centre erected at Bristol.

▪

H. P. Bulmer and Co., Ltd., cider manufacturers, have had plans prepared to carry out extensions to their factory at Moorfields, Hereford.

▪

Extensions costing £25,000 are being made to the Liverpool factory of **Thompson and Capper Wholesale Ltd.**, manufacturing and wholesale chemists.

▪

The Herring Industry Board, 1, Glenfinlas Street, Edinburgh, 1, will shortly erect a new £5,000 factory at Greenhill, Peterhead.

▪

Approval has been received by **Cooked Meat Services, Ltd.**, 141, Crown Street, Aberdeen, to plans for the construction of a new factory on a site at Tullos, Aberdeen.

▪

New factory extensions covering 20,000 sq. ft. are planned at Slough Trading Estate, Bucks, by **Weston Biscuit Co., Ltd.** The work of laying the foundations is to begin at an early date.

APPOINTMENTS AND RETIREMENTS

Mr. Wilson Marriage Impey has been appointed chairman of Marriages' Flour Mills.

*

Mr. E. A. Mitchell, a director of the Chandpore Tea Co., has been appointed chairman in succession to Lord Blackford, who has resigned from the board.

*

Mr. F. D. Armstrong has been elected a director of Beecham Group Ltd. Mr. Armstrong is managing director of H. W. Carter and Co. Ltd., recently acquired by Beecham Group Ltd.

*

Mr. Frank J. Clarke, managing director of Clarke-Built Ltd. of Chiswick, has been elected chairman of the Executives Association of Great Britain.

*

Mr. David Brooke has been appointed an ordinary director of Brooke Bond and Co. Mr. Neville Brooke has retired from the board.

*

Mr. R. R. Askew has been appointed technical representative of Stainless Steel Vessels (London) Ltd. for the Yorkshire, Northumberland and Durham areas. Prof. W. Oliver will continue to serve the company's Scottish customers.

*

At the request of the Potato Marketing Board the Minister of Food has released Mr. Roscoe Herbert, C.B., C.M.G., Deputy Secretary, Ministry of Food, for appointment by the Board as their general manager.

Mr. Herbert took up his new duties early in March.

*

Mr. C. C. Harris has resigned his position as managing director of George Borwick and Sons Ltd., and Mr. H. R. T. Loosemore has been appointed general manager. Mr. Loosemore's previous position of sales manager has been filled by Mr. D. A. Sansom. Mr. C. W. Flatman has been appointed marketing manager, a position left vacant in previous years. Mr. Flatman's responsibilities will include distribution, advertising and sales promotion.

*

Dr. D. W. Hayward, works manager at the Ruabon factory of Monsanto Chemicals Ltd., has been appointed assistant to the managing director, Mr. Philip A. Singleton. His appointment is a preliminary to assuming, with the company's American associates, Monsanto Chemical Co., world-wide responsibilities as technical liaison officer for Monsanto Chemicals Ltd. and Monsanto Chemicals (Australia) Ltd. Dr. Hayward will establish his headquarters in St. Louis, U.S.A., in September, 1955, after visiting Australia and New Zealand.

A.P.V. manager in Formosa

Mr. R. M. D. Odgers, export manager of the A.P.V. Co. Ltd., recently found himself in Formosa following up some important enquiries shortly after the evacuation of Nationalist troops from the Tachen Islands. In spite of the strained situation, he says the visit proved well worth while. Mr. Odgers was on a market survey of Far Eastern countries including Hong Kong and Japan when he was diverted to Formosa.

*

Mr. E. V. Weekes, formerly area manager at the Ruabon factory, is appointed works manager in succession to Dr. Hayward.

*

Mr. Hugh Gyle-Thompson, vice-chairman of T. Wall and Sons (Ice-Cream) Ltd., and a director of T. Wall and Sons Ltd., the parent company, of London, Manchester and Edinburgh, has resigned his appointments on the boards of both companies. Mr. Gyle-Thompson, who is 41, commented, following the announcement of his resignation: "We are parting on the best of terms after 24 exciting years together. A change does no one any harm once in a lifetime." T. Wall and Sons (Ice Cream) Ltd. was formed on January 1, 1955, to produce and market the company's ice cream products, a separate company being formed to handle the meat products business. Before the formation of the two separate producing and marketing companies, Mr. Gyle-Thompson was marketing director of T. Wall and Sons Ltd.

Blackcurrant ice cream

Blackcurrant is to be the latest ice cream flavour. T. Wall and Sons, Ltd., have purchased 55 tons of blackcurrant juice to flavour ice cream which will be marketed in the Spring.

An official of the company said that this will be the first time blackcurrant ice cream will have been available nationally in this country. It will be sold only in tubs, family bricks and in bulk gallons for the catering trade.

Meat tenderiser

The Oppenheimer Casing Co. (U.K.) Ltd. has introduced a new meat tenderiser and improver which, it is said, transforms the cheapest, toughest cuts of meat into a tender delicacy. It was demonstrated for the first time in this country at the Ideal Home Exhibition.

This meat improver, *Meatendra*, is sprinkled on the meat instead of cooking salt, a short time before cooking. A small 2s. 6d. jar is claimed to tenderise 75 lb. of meat. The manufacturers state that the product cuts fuel and meat bills. The housewife uses less fuel because she cooks meat treated with *Meatendra* for a shorter time and she gets more meat for her money because less cooking means less shrinking.

The product is made from salt, dextrose and dried papaya melon juice. The knowledge that papaya juice tenderises was discovered by the Spanish Conquistadores under Cortes when they invaded Mexico. Natives living in tropical Africa have been wrapping their meat in papaya leaves ever since.

Papain, the enzyme or organic substance obtained from Papaya, cannot be used for conventional tenderising and curing of meats on a large scale, because if used in quantities of over 0·05% by weight of meat, it would completely mush up hams in a few days. The housewife, however, can tenderise just before she cooks. The enzyme, however, does not act in the human body, for its action is stopped completely at temperatures of 176°F. —well below those used in cooking.

Varley Pumps buys new property

Varley Pumps and Engineering, the British subsidiary of the American company, Food Machinery and Chemical Corporation, has purchased from Alfred Lockhart Ltd. the complete freehold of the Ferry Lane, Brentford, property, part of which the firm has occupied for the past two years. The company states that the acquisition will enable it to carry out an extensive expansion programme and long-term plans for the manufacture of packaging and food processing machinery, in addition to its existing range of pumping equipment. It is understood that the purchase price was over £100,000.

COMPANY PROFITS AND PROSPECTS

Idris and Coca-Cola

Negotiations have been concluded whereby Idris has acquired a 50% interest in Coca-Cola Bottlers (Scotland).

■

Pascall's 50% dividend

James Pascall, manufacturing confectioners, announce that after depreciation, trading profits for 1954 rose from £343,449 to £474,899. There was an effective dividend increase of 18% to 50%. A 40% dividend was paid for 1953 on the £142,614 Ordinary, equivalent to 32% on the present £178,267 as raised by a one-for-four scrip issue a year ago.

■

Millers' dividend exceeds estimate

H. and R. Ainscough, flour and provender millers and merchants, which was made public in January, 1954, announce a net profit for the year of £35,738 and a dividend of 15% on £201,000 capital, against 10% forecast in the prospectus.

■

Record sugar production

Mr. G. Vernon Tate, M.C., chairman of the West Indies Sugar Co. Ltd., stated in his report for 1954 that both the company's factories had exceeded their previous production records. Their combined output of 137,852 tons of sugar from the 1954 crop was 15,087 tons more than the record established in the previous year. Net profit amounted to £388,573 (£344,279).

■

Fruit packers raise capital

Goldhanger Fruit Farms Ltd., fruit growers and packers, has increased its capital by £94,000 by the creation of 94,000 shares of £1 each fully paid beyond the registered capital of £6,000.

■

Confectioners' increased profit

Consolidated profit of Waller and Hartley, confectioners, for 1954 was £182,034 (£125,853) after tax of £190,306 (£220,818). A final dividend of 16⅔% on the £468,000 Ordinary capital as increased by a 100% scrip issue is recommended. An interim payment of 16⅔% has been paid on the £234,000 capital, following a 20% scrip issue. For the previous year a total of 41⅔%—interim 16⅔% and final 25% — was paid on the £195,000 capital.

■

Ranks' record profits

Group trading profits of Ranks Ltd. for 1954 rose from £4·9 million to a record £6·3 million. Dividend has been increased to a total of 19% for the year, as compared with an equivalent of 12½% in the previous year. At the end of the year already substantial reserves had been further strengthened. Following reconstruction work the Premier Mill in London began operations in September last, and there has been heavy expenditure on the Leith Mill, which is part of a long-term proposition. In addition, there has been a continued expansion of the animal feeding stuffs business.

Lard imports

Lard can already be imported from the Sterling Area without restriction. Details of the licensing arrangements which have now been made for imports of lard from other sources are given in Notice to Importers No. 714, dated February 23, issued by the Import Licensing Branch of the Board of Trade.

Milk tablets for schools

Solid milk tablets, suitably flavoured, may soon be supplied to school children. Local education authorities have been informed that Sir David Eccles, Minister of Education, has amended the Provision of Milk and Meals Regulations, 1945, to permit them to supply these tablets, instead of reconstituted dried milk, at the small number of maintained schools in England and Wales where no satisfactory supply of fresh milk is available.

Experiments have shown that it is possible to produce, at a reasonable price, tablets of compressed dried milk, suitably flavoured and sweetened. These tablets are easy to store and distribute, and some children prefer them to dried milk reconstituted for drinking.

No particular brand of tablets is recommended: local education authorities will be free to use any type which will provide the equivalent of fresh milk prescribed under the Regulations (normally ⅓ pint per child per day) at a cost not exceeding that of fresh milk. The change in the Regulations will take effect on April 1, 1955.

"Newforge" trade mark acquired

Lovell and Christmas Ltd. have acquired the exclusive rights of the registered Trade Mark "Newforge". It is planned to extend the range of selected canned goods to be packed under the "Newforge" Brand, and every care is being taken to ensure the maintenance of the well-known high standard of quality and presentation associated with these products.

Newforge Ltd. will change its name to Robert Wilson and Sons (Food Industries) Ltd., and will continue to manufacture "Newforge" branded products for Lovell and Christmas Ltd. Robert Wilson and Sons (Food Industries) Ltd. will continue to manufacture and distribute existing and new lines of goods under the "Wilson" mark.

First conference on self-service

The first self-service conference to be held in this country will take place on April 12, 13 and 14, 1955, at the College for the Distributive Trades, Charing Cross Road, London, W.C.2. Organised by the Grocery and Provision Trade Self-Service Advisory Committee, the Conference will be opened by Dr. Charles Hill, M.P., Parliamentary Secretary, Ministry of Food. Papers to be read will cover the financial and psychological aspects of self-service, layout, lighting and equipment of self-service shops, staff selection and training, packaging and pre-packaging for self-service, and management problems in self-service. A banquet will be held at the May Fair Hotel at 8 p.m. on April 13.

Lectures on oils and fats

A special course of twelve lectures on "The Production and Utilisation of Glyceride Oils and Fats" will be held in the Department of Chemistry and Biology, Acton Technical College, High Street, Acton, London, W.3, on Fridays at 7.30 p.m., commencing April 22, 1955. Dr. J. H. Skellon, T.D., M.SC., F.R.I.C., head of the Department, will be the lecturer. The fee for the course, which has been specially arranged for industrial chemists engaged in industries utilising oils and fats over a wide range, is £2 2s. Accommodation is limited and early application is advisable.

Pulsometer's Irish agents

The Pulsometer Engineering Co. Ltd., pumping, filtering and refrigerating engineers, have appointed S. W. Carty and Son of 12 Lower Mount Street, Dublin, as their agents for Eire in succession to Mr. H. M. Moore. S. W. Carty and Son will be representatives for pumps of all types, refrigeration and water purification plant, with the exception of aircraft fuel pumps, vacuum pumps and oil refining pumps.

Quick-frozen herrings

East Coast herrings are now being quick-frozen and sold for the first time by Smedley's. This new line is of special interest to mothers who hitherto have been reluctant to serve herrings to their children. This has been due to the amount of small fishbone in the average herring and the consequent danger in feeding youngsters with them.

The quick-frozen herrings are selling, in 8 oz. packs, at 1s. 0½d. to the retailer, and at 1s. 3d. to the housewife.

Food Packaging

Bulk pack of individually wrapped fish cakes.

Self-erecting display cartons used by Foster Clark Ltd. for their jellies. Produced by Boxfoldia Ltd., the carton makes up as it is opened in the Boxfoldia Autolock style. The lid illustration uses a poster technique.

Pilfer proof bottle capsules

What is claimed to be an almost 100% effective tamper-proof bottle capsule has been introduced by Andersen and Bruun, the parent company of Impact Extrusions Ltd., Feltham. Known as the *Alu-Safe* capsule, it consists of a hood made of plasticised aluminium foil which fits any type of bottle neck, can be printed as desired and looks like any other decorative metallic capsule. Any attempt at removing the capsule, however, results in the capsule immediately changing colour and any attempt at replacing it will leave it with permanent contrasting colour spots and streaks which, it is claimed, are impossible to remove. Thus, according to the illustrated leaflet, a blue capsule will become streaked with yellow when tampered with, a black one with white, a green with red, and so on.

This ingenious answer to the pilferer will obviously appeal to bottlers of spirits, liqueurs and other proprietary drinks subject to adulteration.

Resistant gloss coating

A new plastic coating for paper or board which imparts a high gloss as well as providing exceptional resistance to water, oil, grease, acids, etc., is announced in a recent issue of *Packaging Abstracts*, published by the Printing, Packaging and Allied Trades Research Association. The process employs a latex-based compound. It is stated that the coatings are odourless, tasteless and colourless, and do not yellow with age. They are virtually termite proof, and are therefore particularly suitable for export packaging.

Other items in a section on the treatment of packages and packaging materials include a new wood preservative, valuable where packing cases are being shipped abroad and are liable to attack by insects or mildew, insecticide-coated wrappings, new anti-rust process for service equipment and some notes on the uses of epoxide coatings in packaging.

Bulk pack for fish cakes

Mudd's of Grimsby, who distribute fresh fish to retailers all over the country, use an effective bulk pack for one of their lines — Lincolnshire Burgees. A lay-flat cardboard carton printed with brand name, copy and appropriate designs in red and blue holds six of the fish cakes which are individually wrapped in non-moisture-proof *Cellophane* cellulose film, retail price 2s. The carton not only makes a handy "take-away" unit for the shopper but, with its fold-back lid, provides an attractive display piece for the retailer's counter. The clear brand marking is important as the company have been distributing their products for over a hundred years and constantly aim at purity and high quality for anything that bears their name. The *Cellophane* wrap, on the individual items, gives an assurance of purity and protection and, being individually printed with the pennant device and the firm's name, ensures that brand marking is continued even if the units are sold separately.

"Alkapaks"

Paper Goods Manufacturing Co. Ltd. have produced a booklet illustrating the wide range of uses for *Alkapaks* as envelopes, bags, drum, sack and case liners. This tough, flexible and transparent plastic, manufactured from *VisQueen* polythene film, makes an ideal packaging material. It contains no plasticisers or other additives and has no known solvent at room temperatures. No chemical reaction, therefore, can develop between *Alkapaks* and their contents, whether solid or liquid. Being odourless, tasteless, resistant to bacteria, fungi and mould, the material lends itself admirably to food packaging.

Alkapaks are provided already sealed at one end and a wide variety of styles and sizes is available. Various methods of final closure can be employed.

Early development of a canning factory at Alma Park, Grantham, Lincs., is planned by **Eastern Counties Preserves, Ltd.**, Long Sutton, Lincs. It is the aim of the firm to eventually employ 200 people at Grantham.

Food News Overseas

New Polish fish processing plant

The Gizycke fish processing plant in Poland, which was built last year, will have an annual output of 2,300 tons of fish products, according to the Polish Cultural Institute in London. Announcing details of food and agricultural production the Institute states that sugar output in 1953 amounted to 1,105,000 tons, as against 505,000 tons in 1938. Livestock figures, at June 30, 1953, were 7·4 million cattle (including 5·3 million cows), 5·7 million pigs, and 3·3 million sheep. In 1954-5 there it is hoped to increase this to 8 million head of cattle, 11 million pigs, and 4·5 million sheep.

The output target for 1954-5 of cereal crops (combined crops of four cereals) is 12 million tons. Areas of land under contract crops at April 10, 1954, were: seed crops—109,000 hectares, industrial crops—939,000 hectares. Exports of onions, taking 1948 as 100, were 265 in 1952 and 450·3 in 1953.

S. African food company pioneer insulin manufacture

National Meat Suppliers (Pty.) Ltd., a subsidiary of the Imperial Cold Storage and Supply Co. Ltd., said to be the most important institution in the South African food industry, has formed a company in conjunction with Boots Pure Drug Co. Ltd. for the production of insulin in South Africa for the first time. The new company, Biochemico (1954) (Pty.) Ltd., has taken over a factory built in 1950 at Fordsburg, Johannesburg. The excellent supply facilities for pancreas glands from the Imperial Cold Storage Co., combined with the technical "know-how" of Boots, which began production of insulin in the U.K. in 1923, have produced quick results.

The steroid, diosgenin, an important raw material used in the manufacture of cortisone, is also being made by the new company. Another product of the new organisation is surgical sutures.

The Imperial Cold Storage Co. was formed in 1902 to take over the original De Beers Cold Storage Co. Ltd. which was operated by Cecil Rhodes at Kimberley. It now controls a large number of butchery and cold storage businesses and is also the selling agent for a wide range of commodities, mainly foodstuffs. In addition, the company's factories manufacture about 35% of South Africa's butter and 18% of the country's cheese, and control dairies in most of the bigger cities where milk is distributed to a large number of consumers.

Mr. I. J. D. Wentzel and Mr. I. Albow, who are directors of the Cold Storage and Supply Co. Ltd. are also directors of Biochemico. Mr. F. L. Collins, of the Rand Cold Storage and Supply Co. Ltd., another subsidiary of the Imperial Group, is also a director of the new company. The general manager of Biochemico is Mr. V. G. Fox, who, together with two technical advisers from the production department, has been transferred from Boots' Nottingham headquarters.

Schweppes' Rhodesian venture

Schweppes has bought for cash the controlling interest in Spa Food Products, of Salisbury, Southern Rhodesia, from the British South African Co. The company, which has five factories, at Salisbury, Bulawayo, Umtali, Gwelo and Kitwe, makes and sells mineral waters and fruit crushes. Schweppes plans to bring this company under its own management and, after necessary alterations to plant, equipment, etc., to introduce Schweppes' mineral waters into the Federation of Central Africa.

Dry citrus concentrate in U.S.

Commercial production of orange and grapefruit juice concentrate in dry crystals has started in the Orange Crystals plant at Plant City, Fla. The crystals eliminate the need for frozen processing and storage and keep on the shelf in ordinary temperatures, retaining the fresh-tasting flavour and 96% of the vitamin C content of the fresh fruit. When water is added to the crystals they reconstitute to a juice comparable in taste, appearance, aroma and nutritive value to the fresh product. The light weight of the pure crystals compared with present citrus juices (2½ times lighter than frozen concentrate, 8½ times lighter than whole canned juice) allows them to be stored and transported easily and inexpensively.

The process for producing the dry citrus crystals was developed by the Vacu-dry Co. of Oakland, California. This process enables the flavour and nutritive values of the fresh fruit juice to be retained by rapid drying of the fruit in an extremely high vacuum. Orange Crystals are operating the new commercial processing plant in association with Vacu-dry technical personnel. The plant began commercial output at the rate of two million pounds of crystals a year.

Pests invade maize store

Because of the fertility, variety and toughness of weevils, beetles and other pests in South Africa, a huge experimental bulk store built by the Maize Industry Control Board at Lichtenburg in the Transvaal faces problems which were never encountered at similar installations in Australia, from which this store's design was copied. It was hoped that this new type of horizontal elevator—which is much cheaper than the normal vertical elevator—would cut costs of handling maize crops and would facilitate the housing of large carry-over stocks of grain from years of surplus to meet demands in years of shortage. Weevils and beetles have invaded the building on such a large scale, however, that research into ways of killing them without damaging the maize has been going on since October, 1954. According to the Maize Board's annual report, which has just been published, the pests are now being attacked with methyl bromide gas, pyrethrum powder and fumigant tablets which generate a poison gas. The gas does not affect the grain.

New freezing plant in Chile

The National Institute of Commerce in Chile (INACO) recently completed the construction of a freezing plant at Talcahuano which is described as one of the best on the South Pacific coast. It has a storage capacity of 26,000 cubic metres and is capable of storing 200,000 cases of fruit, 1,500 tons of meat, 500 tons of butter and 3,000 cases of eggs. It is equipped with railway sidings and facilities will shortly be available for the berthing of ocean-going vessels alongside.

New growth factor for pigs and poultry

A new growth factor which is claimed to accelerate the growth of pigs and poultry has been developed by the Pfizer Co. in America. A meeting of the American Society of Animal Production has been told that the substance—called Vigofac—will increase swine growth up to 20%. This is in addition to gains already being achieved with the best antibiotic-fortified rations. Vigofac is a fermentation product and a way has been found to produce it commercially on a limited scale. It is to be made available to farmers in Britain through Pfizer Ltd.'s agricultural division as quickly as possible.

OVERSEAS ENQUIRIES

U.S.: Canned goods

Vega Trading Co. Inc., of 22, Hudson Street, New York 13, N.Y., is interested in representing U.K. manufacturers of canned goods and all preserves in jars in the U.S. Interested firms should write to the enquirer direct by airmail, giving full details of the products offered, together with catalogues and prices, c.i.f., in U.S. dollars and cents.

▪

Liberia: Foodstuffs

British Liberian Co., (G.V.) Ltd., 65, Randall Street, P.O. Box No. 77, Monrovia, have asked the British Embassy at Monrovia to assist them in obtaining the agencies of U.K. manufacturers of baking powder, non-alcoholic beverages, fruit juices, biscuits and cakes, butter, cheese, margarine, lard and other fats, cereals, flour, etc., cake and pudding mixtures, cornflour, custard powder, blancmange powder, ice cream powder, canned fruit and vegetables, meat, poultry and game, ham and bacon, fresh and canned.

Firms interested in this enquiry should write direct to British Liberian Co., (G.V.) Ltd., giving full details of their offers. It will be appreciated if at the same time they will notify the British Embassy, Commercial Section, Monrovia, Liberia, that they have done so.

▪

U.S.: Cocoa

Cinderella Products, 1829, San Pablo Avenue, Berkeley, California, wish to get in touch with U.K. exporters of cocoa. Cinderella Products is a division of another Berkeley firm, Sconza Famous Candies Inc., formed for the purpose of selling cocoa. They claim to cover the States of California, Oregon, Washington, Idaho, Nevada, Utah and Wyoming. The firm has a warehouse at Berkeley and would import on their own account or on a commission basis as desired by the U.K. exporter.

Details of the U.S. Food and Drug Administration regulations are available in the Export Services Branch, Lacon House, Theobalds Road, London, W.C.1.

Exporters interested in this enquiry should write by air mail direct to Cinderella Products giving full details of their offers and c.i.f. quotations in U.S. dollars. At the same time they should send copies of their initial correspondence to the British Consulate-General, 310, Sansome Street, San Francisco 4, California, to enable the enquiry to be pursued.

Starch chemists to meet

What is thought will be the largest international gathering of starch chemists to be held in Europe will take place at Detmold, Germany, from April 26-28. At this International Starch Convention papers will be presented in four sections: research, experimental methods, starch manufacture and starch derivatives. Of the 22 speakers, 14 will come from abroad. Mr. E. F. W. Dux of Richmond will give a paper on developments in the field of cold water soluble starches and Dr. L. H. Lampitt and C. H. F. Fuller of London will jointly present a paper on methods used for characterising fractions in investigations on the structure of starch. An Australian speaker will be Dr. W. Hönsch who will discuss the quality of Australian wheat starch products in relation to manufacturing conditions.

During the Convention an exhibition of equipment and machinery for the starch industry will be open.

Birds Eye (Canada) sold

Birds Eye Food (Canada) has been purchased from Unilever Ltd. by a group headed by Mr. M. S. Jennings, president of National Almond Products Corporation, New York, and Mr. H. Paton, president of Paton Corporation, of Toronto. Operation of the company, according to Mr. Paton, will be primarily Canadian, with American "know-how" in the frozen-foods field. The new management proposes to establish frozen-food processing plants in the Maritime Provinces, Ontario and British Columbia. Mr. Jennings will be president of Birds Eye (Canada).

Tomato pulp cannery for Greece

The Agricultural Bank of Greece, in Athens, recently invited tenders for the following machinery and materials for a tomato pulp cannery: A steam-boiler of 160-180 sq. metres heating surface, a semi-automatic sealing-machine for 5 kg. and 10 kg. cans, two autoclaves with manually driven loading crane, a tomato-pulp pasteurising unit, five sheets of stainless steel, a refractometer 0-35, and 100 tons of tin-plate.

Norway's second-best herring catch

When the first phase of Norway's great winter herring fisheries closed on February 21 a total of 734,000 tons of herring had been brought ashore after little more than a month's intensive fishing. The catch was not as big as last year's record yield, but, despite much stormy weather, it was the second-best output ever achieved. The first hand value of the catch is computed at almost £8 million.

FORTHCOMING EVENTS

Society of Chemical Industry

Agriculture Group

April 19. Annual general meeting followed by Symposium on Nitrogen Relationships of Soils and Organic Manures: "Comparative Effects of Organic and Inorganic Nitrogen on Strawberry and Blackcurrant under Field Conditions," by C. Bould; "The Water-Soluble Nitrogen in Manurial Composts," by G. E. G. Mattingly; "The Role of Nitrogen in Commercial Glasshouse Practice," by O. Owen; "Nitrogen Relationships in Permanent Grassland," by K. Shaw; "Nitrogen Fixation Studies in New Zealand," by T. W. Walker, 10.45 a.m., Chemistry Lecture Theatre, Royal College of Science, South Kensington, London, S.W.7.

Food Group

April 27. "The Contribution of Processing Techniques to the Nutritional Value of Food." Presidential Address, by J. H. Bushill; "Annual Processing Techniques," by J. Yudkin; "Fortification," by A. J. Amos, 10 a.m., Town Hall, Bournemouth. Joint meeting with the Royal Sanitary Institute.

Institute of Packaging

April 7. "Glass as a Packaging Medium," by H. Melsom, 6 p.m., Waldorf Hotel, London.

April 25. "The Job of an Export Packer," by J. E. Evan Cook, 7.30 p.m., Belmont Hotel, De Montfort Street, Leicester.

April 25. "Open Forum," 6.30 p.m., Constitutional Club, Liverpool.

Incorporated Plant Engineers

April 19. "Incentive Bonus for Maintenance Work," by A. J. Speakman, 7.15 p.m., Mathers Hotel, Dundee.

April 20. "Industrial Electrical Installations," by F. Jones, 7 p.m., Scottish Building Centre, 425/427, Sauchiehall Street, Glasgow.

Alginate sausage casings

First U.S. seaweed sausage casings will be marketed in mid-1955 when Visking Corp. goes into production. Used in Europe for several years, alginate casings were considered less than desirable by the F.D.A. because calcium salts had to be added to the meat to prevent the casing from dissolving. Visking's product does not require calcium, is expected to cost less than animal-based casings, now at 6 cents/lb. of sausage. Alginate casings should also be considerably more stable in supply and price.

New Companies

F. Lindsay, Ltd. 12.1.55. Fore Street, Castle Carey, Som. Bakers, confectioners, biscuit mnfrs. and pastrycooks, etc. £1,500. Dirs.: F. Lindsay, H. Vaux and E. G. Asher.

Longstaff and Hinchliffe, Ltd. 14.1.55. Mills Street, Middlesbrough, Yorks. To take over bus. of small meats mnfrs. carried on as "Longstaff and Hinchliffe" at Middlesbrough. £4,000. Permt. dirs.: L. E. and Mrs. D. Hinchliffe.

Marsden Dairy (Poulton), Ltd. 11.1.55. 42, Hardhorn Road, Poulton-le-Fylde, Lancs. To take over bus. of E. and A. Marsden, dairymen, at 42, Hardhorn Road, Poulton, Lancs; and to carry on bus. of dairymen, ice cream makers, etc. £1,000. Dirs.: E., Mrs. A., W., M. and A. Marsden.

D. I. Matthews (Grimsby), Ltd. 14.1.55. Chapman's Jetty, Fish Docks, Gt. Grimsby. Fish mchts. and curers, etc. £1,000. Dirs.: C. W. and Mrs. D. I. Carsberg.

Norgard Fishing Co., Ltd. 13.1.55. Wharncliffe Road, Fish Docks, Grimsby. £2,000. Dirs.: A. and J. Norgaard.

Oxenberry's (Frozen Foods), Ltd. 14.1.55. 28/30, East Street, Newquay, Cornwall. £6,000. Dirs.: H. S. H. James, W. Oxenberry, L. J. Knight, R. T. Pappin, C. J. Rickard and M. A. Wall.

Oxford Meat Co., Ltd. 12.1.55. £100. Dirs.: D. C. Shaw, Hule Farm, Wenwick, nr. Warrington, L. Rabinowitz, D. Chamberlain, G. C. Shaw and W. Hollowell.

C. E. Pratt, Ltd. 14.1.55. 109, Colmore Row, Birmingham. Fruiterers, market gardeners, etc. £1,000. Dirs.: C. E. and Mrs. E. Pratt, and J. Longford.

Starkeys (Altrincham), Ltd. 17.1.55. 79, George Street, Altrincham, Ches. To take over bus. of "Starkeys" carried on at Altrincham by A. Littlewood; to carry on bus. of growers of and dlrs. in fruit and vegetables, etc. £1,000. Dirs.: A. Littlewood and H. Barber.

T. and R. Industrial Supplies (Wales), Ltd. 12.1.55. Miskin House, Salisbury Square, Cardiff. Mnfrs. of and dlrs. in bakers' and confectioners' plant, appliances, and equipment, stoves, boilers, etc. £2,000. Dirs.: T. R. and Mrs. G. Thomas, 5, St. Agatha Road, Heath, Cardiff.

Cream Crisp (Grimethorpe), Ltd. Stancliffe Office, Grimethorpe, nr. Barnsley. Ice cream manufacturers or agents, confectionery or sweetmeat manufacturers, manufacturers of and dealers in potato crisps. £225. Dirs.: Mrs. D. Nicholson, C. and F. Turner, W. R. Gardner, M. Hudson, W. Burrows and C. Nicholson.

Dawsons of Coventry, Ltd. Stand 68, New Wholesale Market, Barras Heath, Coventry. Fish merchants, etc. £2,000. Dirs.: F. Dawson, G. A. N. Swaby and J. Drayton.

Trethewey Bros., Ltd. 12, Grant's Walk, St. Austell, Cornwall. Bakers, confectioners, dairymen, etc. £2,000. Dirs.: L. G. and Gladys B. Trethewey.

Garnetts (Soft Drinks), Ltd. Denmark Street, Middlesbrough. Manufacturers of mineral and aerated waters, cordials, etc. £5,000. Dirs.: W. and M. Garnett, and G. E. A. Manser.

The Leonard Hill Technical Group this month

Manufacturing Chemist.—The Nature of Wool Wax and its Economic Future; The Commoner Antihistamines; The Phytosterols of Soya — Chemistry, Properties and Uses; Silicones in Medicine and Pharmacy; Progress Reports: Cosmetics and Toilet Preparations, Antibiotics, and Fertilisers and Plant Nutrients.

Corrosion Technology.—Corrosion Research Laboratories, 3: Corrosion Research at the National Bureau of Standards; Corrosion Problems in the Brewing Industry; Concrete and Corrosion; The Coating of Magnesium Alloys.

Dairy Engineering. — The World's Largest Butter Factory; The Care and Maintenance of Cream Separators; Continuous Buttermaking; Kauri Pine Butter Churns; Tests on the Efficiency of Steam Sterilising Chests.

Fibres.—Fibre Prospects in the South Pacific; Fibre Cores of Steel Wire Ropes; Nylon Bonding Spindle Tapes; Dralon Acrylic Fibre; Basic Research into the Mercerising of Yarn; "Ardil" Protein Fibre; Textile Machines of Today.

World Crops. — The Agricultural Revolution in Turkey; Agronomic Value and Production of T.V.A. Fertilisers; Endrin; The Improvement of the West African Natural Palm Groves; New Trends in Lucerne Seed Production in the United States.

Chemical and Process Engineering.—Preview of the Achema XI Chemical Engineering Exhibition and Congress; Chemical Engineering Review of Centrifuging; The Jacoby Conveyor as a Solids Feeder; Fresh Water from Salt or Brackish Water; New Processes of Coal Treatment; Welding in the Maintenance and Repair of Chemical Plant.

Atomics.—Cosmic Radiation, II; The Construction and Calibration of a 100-curic Gamma Irradiator.

Paint Manufacture.—The Economics of the Paint and Varnish Industry, 3; American Contributions to Phthalocyanine Technology; Service from the small Manufacturer; The Study of Alkyd Resins; Butyl Titanate Heat and Corrosion Resistant Paints.

Trade Marks

APPLICATIONS

ZEBRA.—733,328. Mint-flavoured boiled sweets (not medicated). **G. F. Lovell and Co., Ltd.**, "Rexville," Albany Street, Orindan, Newport, Monmouthshire; Manufacturers.

NIC.—733,204. Coffee, coffee and chicory mixtures, coffee essences and extracts, chicory and chicory mixtures. **Fussell and Co., Ltd.**, Hayes, Middlesex; Manufacturers and Merchants.

ESTRELLITA.—733,236. Non-medicated confectionery. **Duncan and Dawson, Ltd.**, Eastwood Trading Estate, Fitzwilliam Road, Rotherham, Yorkshire; Manufacturers.

CAP.—733,379. Corned beef and canned meats. **Corporacion Argentina de Productores de Carnes** (a Corporation organised under the laws of the Argentine Republic), Bartolomé Mitre 559, Buenos Aires, Argentine Republic, and 58, West Smithfield, London, E.C.1; Meat Exporters

GLUCOVA.—733,436. Liquid glucose for use as food. **James Laing Son and Co. (Manchester), Ltd.**, Ashburton Road, Trafford Park, City of Manchester; Manufacturers.

CANDY CUPBOARD.—733,584. Candy being non-medicated confectionery. **New England Confectionery Co.** (a Corporation organised and existing under the laws of the Commonwealth of Massachusetts, U.S.A.), 254, Massachusetts Avenue, Cambridge, County of Middlesex, Commonwealth of Massachusetts, U.S.A.; Manufacturers.

"CHOCOLADO."—733,620. Non-medicated confectionery made wholly or principally of chocolate. **Robertson and Woodcock, Ltd.**, Trebor Works, Katherine Road, London, E.7; Manufacturers.

GOOD COMPANIONS.—B733,621. Non-medicated confectioney. **Gee Cross Laboratories, Ltd.**, Railway Street, Hyde, Cheshire; Manufacturers.

KEYNUTS.—B733,712. Roasted peanuts. **Kenyon Son and Craven, Ltd.**, Eastwood Trading Estate, Fitzwilliam Road, Rotherham, Yorkshire; Manufacturing Confectioners.

SONIC.—733,913. Icing sugar. **Napier, Brown and Co., Ltd.**, 23 and 25, Eastcheap, London, E.C.3; Merchants.

NUTTY FLIPS.—733,972 . Biscuits containing nut kernel and being for human consumption. **Peter Burdett**, 30, Ack Lane, Cheadle Hulme, Cheshire; Manufacturers and Merchants.

HURRICANE.—734,011; **TORNADO.**—734,012. Canned Fruits. **Seet Kim Soh, Lim Seow Eng** and **Chua Khiam Teck**, trading as **Chuan Seng and Co.**, Pineapple Factory, 47a, Kranji Road, Singapore; Manufacturers.

LASSOO.—734,056. Bubble gum being chewing gum. **Orson Hugh Richford** trading as **Times (Confectionery) Co.**, 36, Upper Berkeley Street, London, W.1; Manufacturer.

NEWSHAWK.—734,238. Non-medicated confectionery. **A. and B. C. Chewing Gum, Ltd.**, 61, Oak Grove, Cricklewood, London, N.W.2; Manufacturers and Merchants.

DAIRYGLEN.—734,328. Mincemeat. **London Grocers, Ltd.**, 11, Dod Street, London, E.14; Merchants.

Information and Advice

This Service is available to subscribers to Food Manufacture. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.

Milk powder for soda bread

B.7402. *When using milk powder for making soda bread, is it necessary to dissolve the milk powder in water and sour it by means of bacteria culture? Furthermore we would like to know* (a) *the quantities of milk powder per stone of flour,* (b) *quantities of bread soda per stone of flour, and* (c) *quantities of any other ingredient.* (Co. Waterford, Eire)

When using milk powder in the making of soda bread, the milk should be reconstituted milk. The bicarbonate of soda used in this type of bread can be neutralised by using cream of tartar in place of the sour milk. This recipe can be used:

Medium flour	14	lb.
Salt	4	oz.
Bicarbonate of soda ..	3½	,,
Cream of tartar	6	,,
Sugar	2	,,
Fat	4	,,
Milk	7	pints

The flour, salt, soda and cream of tartar are thoroughly sieved together and the fat and sugar are creamed together and rubbed into the flour. The milk is added and a fairly soft dough is made. Scale at 1¾ lb. Mould round. Flatten out on baking sheet, egg wash and bake.

Jam boiling

B.7348. *We make about 2½ tons of jam during the course of a year, of which about 75% is marmalade. These jams are made in a copper pan in about 60 lb. batches. Would it be possible to heat this jam with steam in order to ensure quicker boiling, and if this is so, would a small steam boiler with a thermostat be required?* (Birkenhead)

The double-jacketed copper pan is very suitable for jam boiling, and only a very small steam plant will be required for one pan. The steam pressure, however, should not be less than 60 lb. p.s.i.

We would recommend to you the purchase of G. H. Rauch's "Jam Manufacture," which is obtainable from our Book Sales Department at 20s. 6d., post free.

Salted peanuts

B.7422. *Please supply information on the manufacture of salted peanuts.* (Liverpool)

First immerse the peanuts in boiling water for about 15 min. by placing them in a wire basket which fits into a tank provided with steam coils. The skins of the peanuts are then removed. The basket containing the peanuts is immersed in hot arachis oil or coconut oil at a temperature of about 300°F. When brown and sufficiently cooked, the oil is drained off. The kernels are then spread on wire mesh trays for rapid cooling. While still warm, they are salted. This is done by spraying slightly with a 15% water solution of gum arabic and dusting with salt.

As cooked kernels absorb moisture readily, they must be packed as soon as they are salted and cooled.

Information supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery and materials and also general information as follows:

B.7389. *Recipe for meat rissoles.* (Sheffield)
B.7390. *Stabilisation of ice cream.* (Manchester)
B.7391. *Recipe for bloater paste.* (Sheringham)
B.7393. *Processing and bottling Dutch onions.* (New Zealand)
B.7394. *Makers of a peppermint machine.* (Quebec)
B.7395. *Standards for marzipan.* (Manchester)
B.7396. *Valuer for machinery in ice cream factory.* (Malvern)
B.7398. *Manufacturer of starch moulds.* (Ireland)
B.7399. *Information on salted peanuts and cashews.* (Manchester)
B.7400. *Advice on chocolate making in the tropics.* (Bombay)
B.7401. *Manufacturers of ascorbic acid.* (Spalding)
B.7402. *Use of milk powder in making soda bread.* (Ireland)
B.7403. *Advice on making rusks.* (Nottingham)
B.7404. *Advice on flavouring jellies.* (Bombay)
B.7405. *Manufacturers of hand driers.* (Cheltenham)
B.7407. *Second-hand dry rendering plant for fat.* (Trowbridge)
B.7408. *Maker of sausage casing machine.* (Avignon)
B.7410. *Supplier of waxed-cup making plant.* (Holland)
B.7411. *Suppliers of dehydrated potatoes.* (Baden)
B.7412. *Information on pre-cooked frozen food.* (London)
B.7414. *Address of suppliers of "Aldocet."* (Auckland, N.Z.)
B.7415. *Maker of patented soluble coffee.* (Anvers)
B.7416. *Manufacture of glycerinated whole egg.* (Hove)
B.7417. *Advice on making mixed fruit jam.* (Bombay)
B.7419. *Expert on manufacture of meat extract.* (Edinburgh)
B.7420. *Manufacture of processed Cheddar cheese.* (Lebanon)
B.7422. *Manufacture of salted peanuts.* (Liverpool)
B.7423. *Makers of stencil cutting machine.* (Long Sutton)
B.7424. *Makers of gravity filling machines.* (Derby)
B.7425. *Production of synthetic flavourings.* (Trinidad)
B.7427. *Recipe for "Nonpareils."* (Herts.)

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

727,030. P.A.S.T. Prodotti Alimentari Sistema Tallarico: Machine for the separation of the tissue part from the juices or oils of vegetable products.
727,039. British Vinegars, Ltd.: Manufacture of vinegar.
727,072. Soc. Civile d'Etude des Produits de la Mer: Production of powdered fish.
727,293. Crown Cork and Seal Co. Inc.: Container sealing apparatus.
727,387. Nordap-Kraftfahrzeug Ges.: Mincing machines.
727,396. Santesson, G. O. C. H.: Mixtures containing common salt intended for household purposes and processes for producing same.
727,473. Armand, C. G. M.: Depositor for depositing cream such as that used in the manufacture of fondants, or soft centres for chocolates and other like sweets into moulds or on plates.
727,529. Metal Box Co., Ltd.: Closures for jars, bottles, or similar containers.
727,556. Toussaint, A.C. Wiebel-: Packing means for eggs or other fragile articles.
727,563. Dale, F. H.: Apparatus for immobilising cattle or other animals in pens.
727,641. British Soya Products, Ltd., and Learmonth, E. M.: Processes for the treatment of soya beans and other leguminous seeds.
727,743. Rose Bros. (Gainsborough), Ltd.: Wrapping machines.
727,798. Investigacao e Exploracao Industrial Soc.: Method and apparatus for separating the kernels from cashew and like hard-shelled nuts or seeds.
727,800. Miag Muehlenbau und Industrie Ges.: Apparatus for conditioning wheat or like grain.
727,924. Kraus, E.: Electrical device for grilling foodstuffs.
727,999. Metal Box Co., Ltd.: Methods of and apparatus for closuring jam jars.
728,069. Kunzle, C.: Envelopes for containing articles of confectionery.
728,096. Kure, G.: Washing machines.
728,168. Aktieselskapet Protan: Method for preserving food.
728,174. American Machine and Foundry Co.: Wrapping machines.
728,261. Kemps, A. W. W.: Process for the treatment of meat.
728,308. Trapow and Co., Ltd., D.: Labelling apparatus.
728,330. Baker Perkins, Ltd.: Heat treatment of flowable masses, more particularly chocolate.
728,389. Dorin, E. M.: Spit for roasting.
728,533. General Foods Corporation: Food product and process of preparation.
728,617. Blow, Ltd., J. J.: Means for cooling milk churns.
728,659. Ackroyd, I. L. T.: Juice extractors for fruit.
728,799. Rey, H. D.: Coconut splitter.
728,873. Baker Perkins, Ltd.: Tray tilting and pan discharging device for baking oven conveyors.

ABSTRACTS OF BRITISH PATENTS

Decorating biscuits

This invention is concerned with decorating or ornamenting uncoated biscuits. In the past when it has been desired to decorate or ornament biscuits with icing sugar or like substances, it has been necessary to carry out the process by hand. This is a slow and expensive practice.

The invention comprises means for advancing the biscuits in line by a step-by-step movement, a reservoir of the substance to be applied to the biscuit and a stamp bearing a replica of the desired decoration or ornament. This stamp is brought into, or on to the reservoir to pick up the required amount of coating and then brought into contact with the uncoated biscuit.

There are many other ways in which the present invention may be carried out, the precise method depending to a large extent on the substance to be applied to the biscuit.

In practice, several stamps and lines of biscuits are operated at the same time in order to increase production.

In all cases the stamps are preferably not rigidly mounted on the operating bar or like mechanism but are resiliently and also rockably mounted thereon to compensate not only for the different thicknesses of the biscuits but also for any unevenness in their surface. In some cases the face of the stamp may be flexible for the same purpose.—722,851. *W. P. Webster and A. C. Page.*

Fish washing machines

This invention relates to machines for washing fish, particularly salt water fish. Its object is to provide a machine of simple construction which will enable fish to be thoroughly washed with a minimum of handling.

The machine comprises a frame with an endless conveyor belt movable on rollers mounted in it, a number of parallel, cylindrical brushes disposed above and transversely of the belt and rotatably mounted in the frame, spray nozzles associated with the brushes, means for driving the conveyor belt at one end, an auxiliary intermediate means for also driving the belt, and means for rotating the brushes so that the bottoms thereof travel in the same direction as the adjacent part of the conveyor belt and at a higher speed than the belt.

A machine is also claimed wherein the upper run of the belt at the front of the machine is inclined upwards towards the rear of the machine.

Another machine is claimed in which the belt driving means comprises an electric motor, a reduction gearing, a clutch, and gearing for transmitting the drive from the motor to the conveyor belt at one end of the machine and also to the conveyor belt at the upper end of the inclined part of the conveyor belt. The invention also covers a machine wherein the conveyor belt passes around the roller at the front end of the machine, then upwardly at an incline and around a second roller, then downwardly and around a third roller, then forwardly and horizontally and around a fourth roller at the rear end of the machine, and then back to the roller at the front end of the machine.

Other claims are for a machine wherein the third roller is arranged below and to the rear of the second roller; for means of adjusting the tension of the conveyor belt; for fixed tables arranged beneath the inclined and the horizontal parts of the belt, equipped with a number of small anti-friction rollers; for a conveyor belt formed with perforations, or having its outer surface roughened to prevent fish from slipping.—725,127. *Donald Andrews.*

ABSTRACTS OF FOREIGN PATENTS

Maturing of flour

A finely divided sodium carbonate perhydrate is used to mature dry flour for use in baking. One hundred p.p.m. of the perhydrate powder classified by air elutriation to a size range of 0-10μ is uniformly blended with the flour. A standard baking test with this flour showed good volume, texture, and crumb structure.—U.S. 2,686,125. *Paul H. Margulies.*

Emulsifying agent for baked goods

A method is described of manufacturing baked goods capable of retaining crispness for some time if exposed to high-humidity conditions. An emulsifying agent is incorporated into the shortening in an aqueous dispersion which is a hydrophilic substance. Under baking conditions it is converted into a hydrophobic substance. Examples are egg whites, ammonium oleate, palmitate, stearate, linoleate, etc. Concentrations of 1-10% of the weight of the shortening are used.—U.S. 2,688,551. *Seymour C. Graham.*

Glutamic acid

The crystallisation of glutamic acid for use as a seasoning agent from protein hydrolysate is retarded by the presence of carbohydrate decomposition products, principally levulinic acid and (hydroxymethyl) furfural. By extension of the hydrolysate with volatile organic solvents having a dielectric constant greater than 4 (at 25°) the retardants are removed and the rate of crystallisation and yield of glutamic acid are increased. Both the sp. gr. and viscosity of the hydrolysate are reduced by the extension. Less sodium hydroxide is required to neutralise the mother liquor after crystallisation.—U.S. 2,648,704. *Tetsuo Ogawa and Mei Ohno.*

EMULSIFIERS

Advita offer a wide range of fatty acid esters, 'tailor made' to the specific requirements of individual manufacturers, including HYMONO, a concentrated G.M.S. with a monoglyceride content of 90%. A complete list of Advita Emulsifiers is available on request. These include :—

HYMONO AND ADMUL
(GLYCERYL MONOSTEARATE)
GLYCERYL MONO OLEATE
POLYGLYCEROL ESTERS
GLYCERYL MONO LAURATE

VITAMINS A and D

Advita prepare vitamin dilutions, packed in individual batch size containers, adjusted in their laboratory to meet specific requirements.

DIACETYL and ACETYL METHYL CARBINOL

For the simulation of Butter Flavours

The Advita Technical Service is always at your disposal

ADVITA LIMITED **2 KINGSCOTE ST. LONDON, E.C.4** **TEL. CENTRAL 7474**

ADL 61-5

WILLIAM BRYAN LTD

For Finest Quality

PEPPER & SPICES

MACE, NUTMEGS, GINGER, CINNAMON, ETC.

HERBS **KIBBLED ONIONS**

VEGETABLE EXTRACT **ONION POWDER**

Send your enquiries to :

3 LOVAT LANE
EASTCHEAP, LONDON, E.C.3

TELEPHONE NO.: MAN 1457. TELEGRAPHIC ADDRESS: VOLTZINE, BILGATE, LONDON

MANUFACTURERS

British Rayophane Ltd.

WIGTON
CUMBERLAND

* * *

WORLD-WIDE DISTRIBUTION

● TRANSPARENT CELLULOSE FILM ●

MOISTUREPROOF ANCHORED-WATERPROOF & NON-MOISTUREPROOF

HEAT-SEALING GUM-SEALING AND TWIST-WRAPPING QUALITIES

● REELS & SHEETS (COLOURLESS & COLOURED) ●

RAYOPHANE FOR PROTECTION AND WRAP-APPEAL

* * *

SOLE SELLING AGENTS

FELBER, JUCKER & CO. LTD.

LONDON · Thames House
Queen St. Place, E.C.4
Tel.: CITY 1087 (4 lines)
Grams: Felber, Stock, London

MANCHESTER: 29 Peter Street
Tel.: Blackfriars 3337 (6 lines)
Grams: Felber, Manchester

OSBORNE MIXERS

for

BETTER & QUICKER MIXING

VIEW OF LARGE MIXER COMPLETE WITH MOTOR AND TWO MIXING HEADS

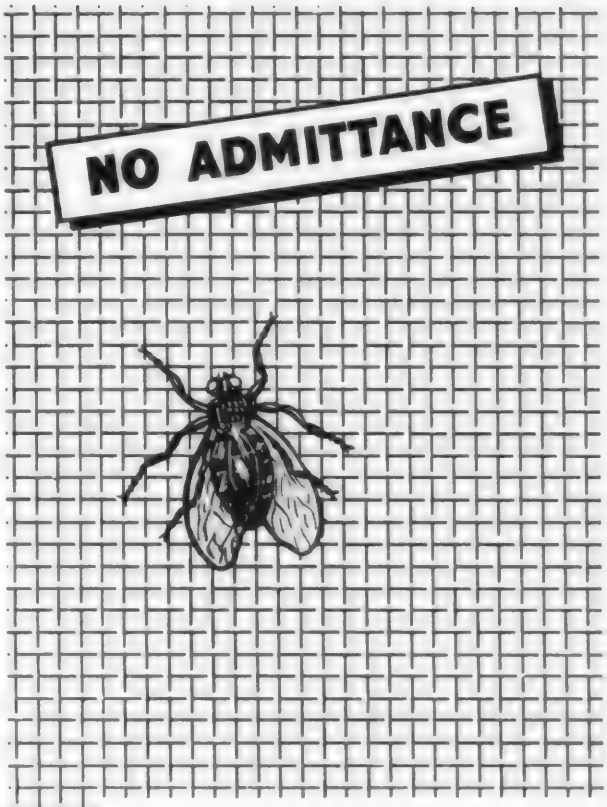
Our plant has now been developed to cover ALL requirements and we can supply mixers to fit any container from 2 gals. upwards. Forward details of your requirements giving size of container and media to be mixed to:

THE

OSBORNE ENGINEERS LTD

HARROW HOUSE · HARROW STREET · HULL

TELEPHONE 37305



Protect your Products

FROM GERM CARRYING INSECTS

by screening doors and windows with

'HARCO' WOVEN WIRE

Available ex stock in a suitable mesh and gauge in Galvanized Steel Wire.

For special requirements, cloth in Phosphor Bronze or any other metal can be supplied.

Please send for our Catalogue No. FD 269.

Harvey

G. A. HARVEY & CO. (LONDON) LTD.,

Woolwich Road, London, S.E.7 GREenwich 3232 (22 lines)

Edible Oils and Fats

AND ALLIED MATERIALS

For the Manufacture and Preparation of Food

S. BRAMWELL & CO., LTD.

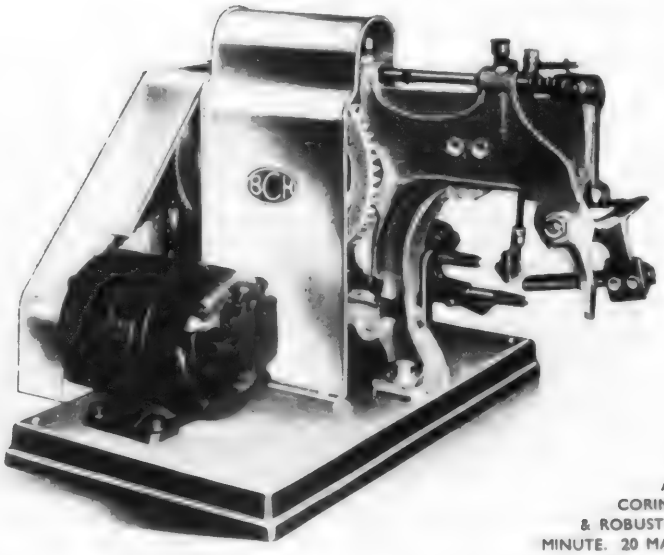
FOUNDED 1875

4 BROAD STREET PLACE
LONDON, E.C.2
LONDON WALL 5901

PRODUCE EXCHANGE
MANCHESTER, 4
BLACKFRIARS 6311

LATEST MACHINERY

FOR *FOOD PROCESSING*
FRUIT & VEGETABLE PRESERVING
CONFECTIONERY
MANUFACTURE
ETC.



CONSULT

BCH

APPLE PEELING & CORING MACHINE. SIMPLE & ROBUST CONSTRUCTION. 28 PER MINUTE. 20 MACHINES TO ONE FIRM ALONE. NOW FITTED WITH SAFETY FRICTION DRIVE.

WM. BRIERLEY, COLLIER & HARTLEY, LTD., BORO WORKS, ROCHDALE
Telephone : 4181

London Office: SUNRIDGE, RUDEN WAY, EPSOM DOWNS, SURREY. Telephone: Burgh Heath 2749

ESTABLISHED 1835

H & W
Code 1403
AMMONIA SOLUTION
s.g. 0.88, about 35% w/w NH_3, Pb not more than 0.005 p.p.m.

H & W
Code 3223.5
CITRIC ACID
Pb not more than 0.5 p.p.m.

H & W
Code 4633.5
HYDROCHLORIC ACID
approximately 5N, Pb not more than 0.005 p.p.m.

H & W
Code 6107.5
NITRIC ACID
s.g. 1.42, Pb not more than 0.005 p.p.m.

H & W

Reagents for the determination of

LEAD IN FOODSTUFFS

H & W
Code 6521
PERCHLORIC ACID
s.g. 1.54, 60% w/w $HClO_4$
Pb not more than 0.005 p.p.m.

The reagents for the determination of lead in foodstuffs, mentioned in connection with a report of the Analytical Methods Committee of the Society of Analytical Chemists, are available from Hopkin & Williams Ltd.

HOPKIN & WILLIAMS
Limited

Manufacturers of Pure Chemicals for Research and Analysis

FRESHWATER ROAD, CHADWELL HEATH, ESSEX

H & W
Code 6959
POTASSIUM CYANIDE
Pb not more than 0.5 p.p.m.

H & W
Code 8362.5
SULPHURIC ACID
s.g. 1.84, Pb not more than 0.005 p.p.m.

Denton's
DENTOLITE
+ Self-Sterilising +
EMULSION PAINT
The only paint of its kind in the world

DENTOLITE is the latest of all modern finishes. It is a first quality EMULSION PAINT manufactured in a complete range of colours by a special process (World Patents applied for) which makes it permanently self-sterilising. Thus, throughout the entire life of the paint, it destroys micro-organisms in contact with or deposited upon it, so helping to reduce the risk of the spread of disease.

The unique germicidal properties of DENTOLITE make it **the perfect fungicidal finish,** *preventing the growth of mould and fungi on itself or surfaces to which it is applied.*

DENTOLITE is non-poisonous and non-toxic.

Manufactured by the makers of **DENTONAMEL**

TRADE MARK
SINCE 1780
DENTON EDWARDS PAINTS
LIMITED
Paint and Varnish Makers for over 160 years
ABBEY ROAD BARKING ESSEX
Tel.: Rippleway 3871 (10 lines). Grams: EDLACA, Barking

THE FREDK BOEHM EXPERIMENTAL KITCHEN

has evolved many successful new recipes to meet individual requirements and has solved many manufacturers' problems

PROTEX *Hydrolised protein* | **YEATEX** *Autolysed yeast extract* | **MSG** *Mono-sodium glutamate 99% pure*

FREDK BOEHM LIMITED
19 Bentinck Street, London, W1. Welbeck 7933

Examples of recipes recently evolved include the following:
CREAM OF MUSHROOM SOUP
CREAM OF CHICKEN SOUP
TOMATO SOUP
BAKED BEANS

See ALBRO for Fillers & Cappers

This vacuum-operated Powder Filling Machine is DUSTLESS in operation!

ALBRO Powder Fillers are so efficient that reduced rates of insurance can be obtained under the Workmen's Compensation Act when powders of a deleterious or abrasive nature are being filled by these machines.

This ALBRO Powder Filling Machine handles bottles, tins, cartons or drums of many sizes with equal ease. Even cardboard cartons which are not absolutely air-tight can be filled satisfactorily.

The exclusive vacuum operation ensures completely *dustless* filling of powdered soup, spices, peppers, coffee or custard powder from floor level or by gravity from above.

Machine is hand or pedal operated by junior or unskilled labour.

Output 1,800 containers per hour on smaller sizes.

Two-head semi-automatic and fully automatic rotary powder fillers are also available. Ask for details.

ALBRO Filling Machines
for Liquids, Powders & Pastes

ALBRO FILLERS & ENGINEERING CO. LTD., WHARF ROAD, PONDERS END, MIDDX.
Telephone: Howard 2622 *Telegrams: Albromach, Enfield*

Keep foods and beverages

safe

from airborne

Bacteria

Hanovia ultra-violet equipment kills airborne germs and prevents the contamination and spoilage of beverages or food products during manufacture and storage. These bactericidal units can be adapted to suit the special requirements of bottlers, brewers, food manufacturers and others. They are suitable for installation over tanks, vats and conveyor belt systems—in fact, wherever a safe, sterile atmosphere must be maintained.

Hanovia Ultra-Violet Bactericidal Units

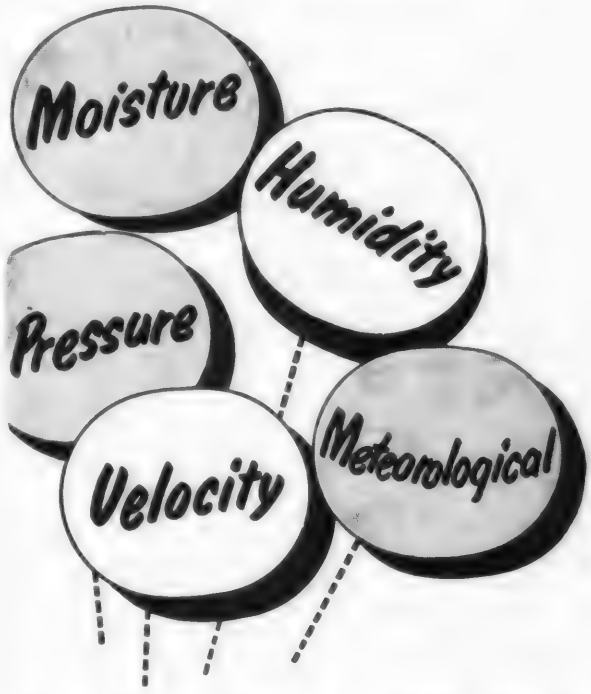
- Prevent re-contamination of sterile bottles after washing.
- Guard against the introduction of bacteria and spores during canning, bottling and wrapping processes.
- Keep storage rooms free from organisms so that food will remain fresh much longer.
- Stop food spoilages due to mould growths in tanks and vats.

Hanovia will be pleased to send leaflets and full information on any application of ultra-violet equipment for bactericidal purposes.

HANOVIA Slough, Bucks

Specialists in ultra-violet equipment for industry T78

What is your problem...



We may have the answer to a problem which you believe to have no solution. The experience of 96 years helps us to answer your questions.

HUMIDITY: Measurements — recording — control — remote indicating. Hygrometers and Psychrometers for installation in machines, rooms, buildings, factories, dryers, *Range of approx. 250 instruments.*

MOISTURE: Indicating hygrometer for hygroscopic materials such as cereals, peas, beans, lentils, tea, coffee, cocoa, wood, wool, textiles, flax, powders, soil, etc. *Range of approx. 25 instruments.*

VELOCITY: Anemometer, vane and cup types, for immersion and remote indicating, flow meters, etc. *Range of approx. 30 instruments.*

PRESSURE: Barometers, mercury diaphragm types, differential gauges, vacunm gauges, liquid gauges, etc., recorders. *Range of appox. 50 instruments.*

METEOROLOGICAL: Complete range for local weather forecasts. *Range of approx. 80 instruments.*

Please let us know your problems and we will be pleased to let you have the particular leaflet applicable to your requirements.

EST. 1859 Lambrecht INSTRUMENTS

SOLE AGENTS AND CONCESSIONAIRES

OPANCOL LTD.

3/4 Sherwood Street, London, W.1

Telephone: GERrard 0711

"Don't Burn Money"

says Private Btu (the British Thermal Unit)

"If the method of firing your boiler is wasteful you are as good as burning money and probably polluting the atmosphere too."

FUEL EFFICIENCY PAYS

For example . . . A large firm in the south of England installed two mechanical stokers at a cost of £2,050. This enabled the firm to use less fuel in spite of it being of a lower grade than previously. This has resulted in a monetary saving of £900 per annum. Hence the capital expenditure will be regained in less than three years.

Combustion Engineering Association 6 Duke Street St. James's London SW1 say that this is an outstanding example of how fuel efficiency pays. They have many others and will be pleased to pass on further information concerning the advantages of mechanical stokers together with names of manufacturers.

Government loans may be obtained for approved fuel saving schemes.

Issued by **N*I*F*E*S** *National Industrial Fuel Efficiency Service*

71 Grosvenor Street London W1 *Telephone:* Hyde Park 9706

The most informative up-to-date, yet thoroughly practical, book on the production of sausages and small goods that has ever been published

SAUSAGE AND SMALL GOODS PRODUCTION

by Frank Gerrard, M.Inst.R., M.R.San.I.

208 *pages. Demy* 8*vo. Third edition, reprinted twice. Price* 15*s. net. Postage:* 4*d. Home,* 10*d. Abroad.*

CONTENTS

Equipment: Electrical Running Costs, Fuses. Mincer Operation and Maintenance, Mincers, Knives and Plates, Filling, Fillers, Bowl Choppers, Combination Machines. Small Trade Equipment: Accommodation, Ventilation, Plant, Planning. Small Factory Layout: Coppers, The Smoke House, Factory Layout, Factory Hygiene. Sodium Hypochlorite. Sausage Ingredients. Binders. Seasonings. Sausage Containers. Storage and Preservation. Meat Curing. Costing. Sausage Recipes. Continental and American Types. Factory Recipes. Cooked Meats. Meat for Canning. Utilisation of Waste. Legal Enactments specifically affecting Sausage Manufacturers.

Obtainable from your bookseller.

LEONARD HILL [BOOKS] LIMITED, 9 EDEN STREET, LONDON, N.W.1

How STURGE pack CITRIC ACID ANHYDROUS

An airtight pack, proof against damp and contamination is provided for Sturge citric acid anhydrous. The container has a *polythene* liner which is heat-sealed at the neck.

Citric acid anhydrous has a higher acid content (8·5%), for the same bulk and weight. Please ask for details.

JOHN & E. STURGE LIMITED

1 Wheeleys Rd., Birmingham 15. Midland 1236/7

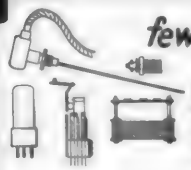
Manufacturers of Fine Chemicals since 1823

CA7

An electronic DIP-STICK that answers any level control problem

Here is a simple, compact device that gives immediate indication when the contents of a container have reached a set level. In addition to its visual warning, the TEKTOR can be connected to any circuit to sound an alarm, operate a stop switch or control the equipment feeding the container.

few components



A dipstick and co-axial cable, together with the compactly housed transformer, valve, relay and condenser are the only components. No flaps, floats or moving parts!

controls solids or liquids

Milk, fruit juices, beverages, sugar, fats, starch, tea coffee, flour, cereals, currants, nuts, oils, etc. can be electrically controlled by the TEKTOR.

fits any container

Bins, vats or trays of almost any shape and size can be fitted. The TEKTOR dipstick merely needs a ⅜" hole; the unit housing (approx. 7" square and 4" deep) is mounted anywhere nearby. Remote control can easily be arranged.

costs ·015 penny an hr. to run

The TEKTOR's 15 watts consumption (1/60th unit) costs approximately ¼d. per 44-hour week, a negligible overhead. A normal radio-type valve is used.

Send now for free folder PD13

HENRY SIMON LTD

CHEADLE HEATH · STOCKPORT · ENG.

THE FIELDEN TEKTOR

Keeps things under control

HS 161/PS

CANNING TOWN GLASS WORKS LTD.,
30-34 NEW BRIDGE STREET, E.C.4
Telephone: CENTRAL 5342-5 • *Telegrams: DRYAD, LUD, LONDON*
WORKS: CANNING TOWN, E.16 and QUEENSBOROUGH KENT

THE PERFECT BUTTER FLAVOUR

Buttabelle

even improves flavour when butter is used

BUSH

W. J. BUSH & CO. LTD. • LONDON • E.8
Telephone: CLISSOLD 1234

Food Trades Overalls

ALSO CONTRACT LAUNDERERS

Overgowns, reversible

SPRING GROVE SPECIALISE IN THE HIRE AND REPAIR OF A WIDE RANGE OF INDUSTRIAL GARMENTS FOR FOOD MANUFACTURERS AND DISTRIBUTORS

Articles available under Hire Service include:

Overalls	*Coats*	*Boiler Suits*	*Kitchen Linen*
Overgowns	*Jackets*	*Aprons*	*Table Linen, etc.*

SPRING GROVE LAUNDRIES LTD.

15 PENNARD ROAD, LONDON, W.12

Telephones: SHEpherds Bush 6866, 2934

IN THE FIRST INSTANCE PLEASE CONTACT THE DEVELOPMENT MANAGER

- **Customers have no Capital costs—Spring Grove pay these.**
- **Three complete sets supplied new.**
- **Free repairs and replacements.**
- **Guaranteed weekly collection and delivery.**
- **Charges only slightly more than normal laundry charges.**
- **A wide range of garments and sizes etc. available.**

Spring Grove service Greater London, Birmingham, the South-East Coast and many of the Home Counties.

Belted Coats

ESTABLISHED 1846

Supervisors' Coats

THE IMPROVED MORRIS ELECTRIC CHAIN HOIST

has the following improvements:

- An entirely new design of load-chain sprocket.
- An independent hardened load-chain guard.
- A new design, oil immersed, ratchet load brake in addition to the nipper type load holding brake.

This improved Morris Electric Chain Hoist is unequalled for reliability and performance.

WRITE FOR FOLDER F159BFM

BIF 2-13 May CASTLE BROMWICH BIRMINGHAM

STAND D506

SEE OUR EXHIBIT

THE FAST LIFTING BRITISH HOIST WITH THE FLEXIBLE CHAIN

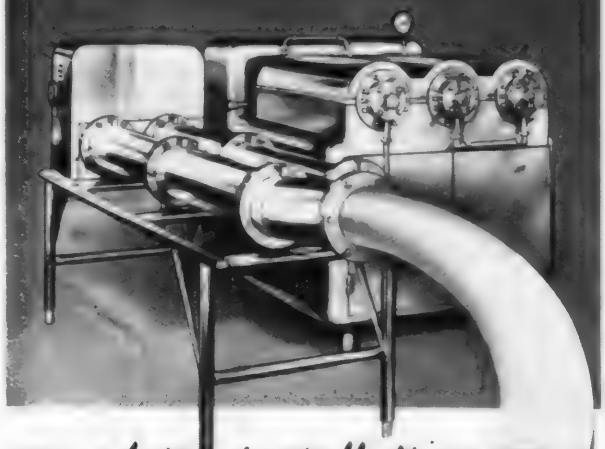
HERBERT MORRIS LTD

P.O. BOX Nº 7

LOUGHBOROUGH ENGLAND

Votator

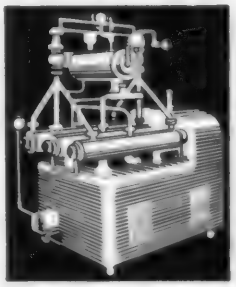
CONTINUOUS PROCESSING APPARATUS FOR MANY FOOD PRODUCTS



complete installations

FROM STORAGE TO PACKAGING MACHINES

Streamlined production from raw materials to delivery of the finished product is possible with Johnson food processing plant. Pastes, pulps, starch, jellies, sauces, soups, fruit juices, chocolate, mayonaise, salad dressing, margarine and fats—all can be handled under hygienic enclosed conditions with variations of the unique *Votator* apparatus. The whole process is continuous, resulting in a more uniform product at lower cost. Layouts for complete plant can be varied to suit individual requirements—let us send you full details.



'Votator' is a trade mark which applies only to the products of the Girdler Company or their licensees.

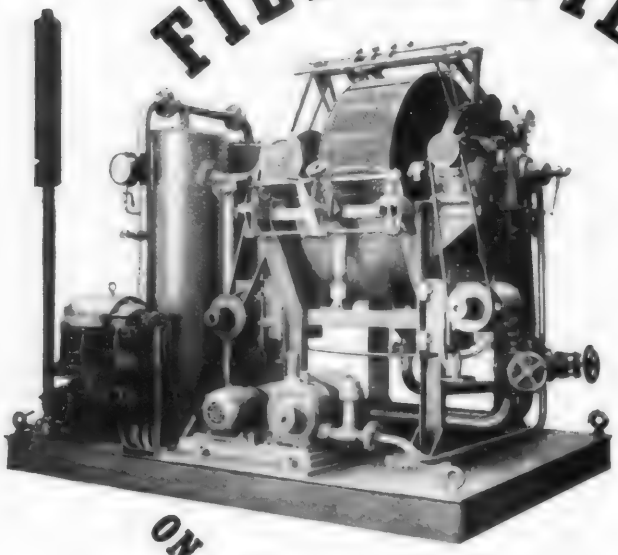
Johnson's

ANOTHER PRODUCT

A. JOHNSON & CO. (LONDON) LTD.

Works & Sales Office: DUKES RD., WESTERN AVENUE, ACTON, W.3
Telephone: ACORN 6081 *Telegrams:* AGENTICUM Telex London
Head Office: AFRICA HOUSE, KINGSWAY, LONDON, W.C.2
Telephone: HOLBORN 7337

FILTER PILOT PLANT



ON YOUR OWN PREMISES

PAXMANS have been building

ROTARY VACUUM FILTERS

for over twenty years

THE SERVICE THEY OFFER INCLUDES :

- Free filtration tests in a well-equipped laboratory where you can witness results.
- Hire service of 10 sq. ft. Filter Units as illustrated, complete, ready to connect up to your electricity supply.
- Rotary Vacuum Filters with scraper or string discharge also Pre-Coat Filters.
- Data and experience accumulated over twenty years enable you to get the best possible advice on your filtration problems.

PAPER · COAL · CEMENT · WHITING · STARCH
LIME · CALCIUM CARBONATE · SEWAGE
FERTILISERS · CAUSTIC LIME · PENICILLIN and various PIGMENTS are a few of the many products dealt with by PAXMAN FILTERS

Paxman

DAVEY, PAXMAN & CO. LTD · COLCHESTER

TELEPHONE: 5151 · TELEGRAMS: PAXMAN, COLCHESTER

F.49

Almonds - Walnuts
Desiccated Coconut
Kernels (Hazelnut and Groundnut)
Ginger

T.M. DUCHÉ *& Sons (U.K.) Limited*

GELATINES

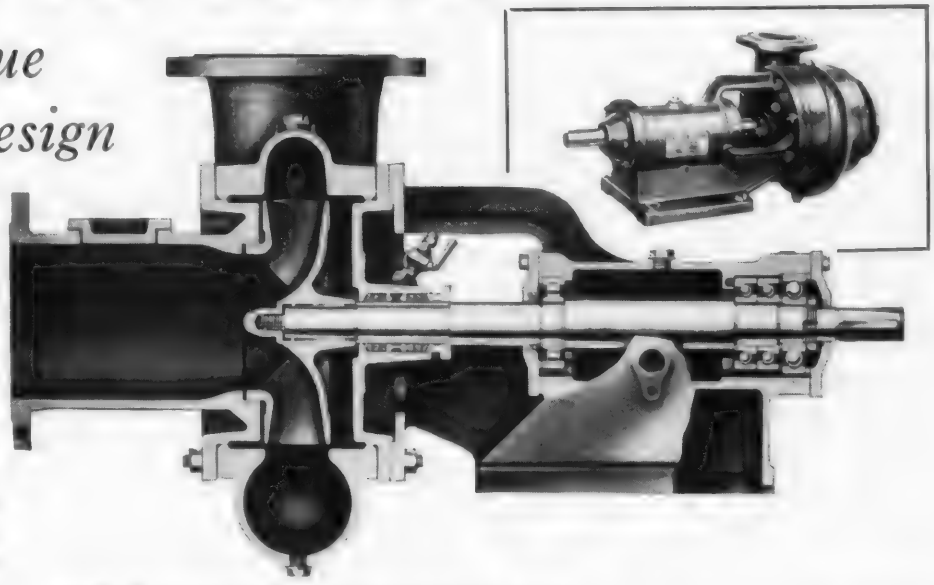
Egg Products
Glacé Cherries

Gum Arabic
Agar-Agar

ADELAIDE HOUSE, LONDON *also* GLASGOW & MANCHESTER

CHOKING and AIRLOCKS PREVENTED

by unique impeller design



Because the impeller blades are specially shaped and the passages diverge (instead of converging, as in the usual pump rotor), these pumps will handle viscous liquids, dense slurry and aerated stock with ease.

With their unique impeller design, Celdecor Egger Pumps are giving outstanding service throughout the world. Let us send you full details.

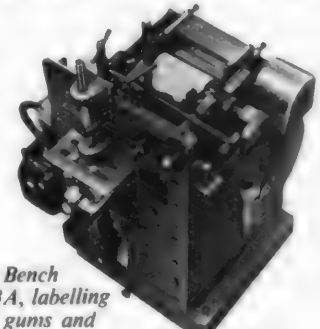
CELDECOR EGGER *patent centrifugal pumps*

Concessionaires for the British Commonwealth

CELLULOSE DEVELOPMENT CORPORATION LTD · Hatch End · Middlesex

Telephone: Hatch End 2261 *Cables: Celdecor, Pinner.* T.A. 7946

The name is NEWMAN



Portable Bench Model 23A, labelling machine, gums and applies labels to small and medium sized packs.

Self feeding label gumming machine Model 1D, motorised, touch bar control

for labelling or gumming

NEWMAN puts the labels on thousands of nationally known products

There are other famous Newman Labellers:
Model 3C for all over gumming,
Model 2B fully automatic, for small cylindrical objects.
Detailed specifications gladly sent on request.

D. TRAPOW & COMPANY LTD. ENGINEERS

113/115C REGENTS PARK ROAD, LONDON, N.W.1 *Tel. PRImrose 6688*

SEALED!

- These scales are fully protected against damp, dust and corrosive gases.
- The floating mechanism is sealed by a unique oil seal.
- All joints are closed by a special composition.
- Scale can even be "hosed down" after use.
- 8 oz. chart in ¼ oz. divisions. Graduated both sides "Light" and "Heavy" for factory use.
- 20 lb. capacity.

Swift Sealed Scales in use at Messrs. Quayside Products Ltd., South Dock, Grimsby

FOR THAT SPECIAL JOB WITH MOIST FRUIT, WET FISH, POWDERY GOODS

Swift SEALED SCALES

Please send for full details • Demonstrations any time, anywhere

SWIFT AND SWALLOW LTD., AIRPORT WORKS, ROCHESTER, KENT • TELEPHONE: CHATHAM 3404

no company already possessing a canteen, or which is contemplating installing one, should be without this book.

FACTORY CANTEENS

THEIR MANAGEMENT IN GREAT BRITAIN

by **JACK HAMPTON**

115 pages First edition Price 15s. net Postage: 4d. Home, 10d. Abroad

Balancing the Canteen Budget · The Factory Canteen Licence · Methods of Factory Canteen Management Factory Canteen Kitchen and its Equipment · Canteen Furniture · Kitchen Personnel · Tea for the Factory Worker · Crockery, Cutlery and Dishwashing Machines · Purchase of Food · Canteen Stores · Canteen Bakery Central Kitchens for Docks and Building Sites . Special Diets in the Factory Canteen . Factory Canteen Cleaning The Risk of Food Poisoning · The Factory Mess Room Regulations · Meal Regulations for Women in Industry Meal Regulations for Young Persons · Training Courses for Canteen Staff · Entertainment in the Canteen . The Company Shop · Industrial Hostels · Works Sports Clubs · Development of the Factory Canteen · The Future of the Factory Canteen.

Obtainable through your bookseller.

LEONARD HILL [BOOKS] LIMITED . 9 Eden Street . London . N.W.1

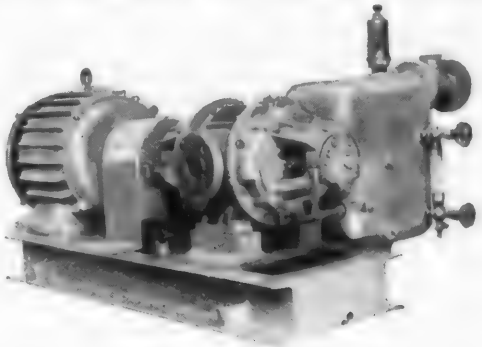
ONLY CLEAN AIR CAN REACH YOUR PRODUCT FROM THIS PUMP!

'NASH HYTOR' CLEAN AIR COMPRESSOR

Regd. Trade Mark

IT'S THE SCRUBBING ACTION OF THE LIQUID SEAL AND ENTIRE ABSENCE OF INTERNAL LUBRICATION

NO FILTERS OR AFTER COOLERS



ONE MOVING PART NO METALLIC CONTACT

British Made

By NASH ENGINEERING CO. (Great Britain) LTD.

Further details with pleasure from Sole Agents and Service Engineers for BRITISH ISLES

NORMAN ENGINEERING COMPANY

HEAD OFFICE: Hytor Works, Commerce Way, Purley Way, Croydon Telephone: Croydon 2278-9

NORTHERN OFFICE: 273 Royal Exchange, Manchester, 2 Telephone: Blackfriars 1033

In Stores
Warehouses & Factories

Insect Pests are DEAD
AGAINST FUMITE

Simply, safely and efficiently FUMITE DDT/LINDANE smoke insecticide destroys common insect pests in Stores, Warehouses, Factories, and protects timbers against wood-boring beetle attack. Foodstuffs in bulk, bags and original containers may be treated *in situ* at the recommended dosage without fear of tainting. For a few pence for 1,000 cubic feet, FUMITE clears the premises of pests and *keeps* them clear for months.

Quick-acting FUMITE LINDANE is specially recommended in cases where DDT is not acceptable

FUMITE DDT/LINDANE Smoke Insecticide

British Patent Nos. 621732, 621894 and 651684—others pending

Service and/or supplies from approved servicing companies. Special instruction leaflet from the Sole Manufacturers:

WAECO LTD. (FUMITE DIVISION)
120/2 VICTORIA STREET, LONDON, S.W.1 Tel: *TateGallery9626*

MEAT

SPOT OR FORWARD SHIPMENTS

NORWOOD

SUPPLIERS OF ALL TYPES OF MEAT AND OFFALS

W. NORWOOD & SONS LTD.
LONDON, E.18
Telephone: WANSTEAD 6688
TELEX 2-2309
and at
GLASGOW — NEWCASTLE

PLENTY Rotary Pumps

Suitable for pumping:

Cream
Sugar Syrup
Biscuit mixture
Margarine
Chocolate
Fruit Juice
Vegetable oil
Cheese
Jam
Bakers' dough
Ice Cream

- Ideal for transfer duties.
- Smooth flow without churning.
- Suction up to 29 ft. water vacuum.
- Up to 350 lbs. per sq. inch for pressure filling.
- Infinitely Variable and Reversible.

Write for full details to:

Telephone: NEWBURY 7
PLENTY & SON Ltd
Marine Engineers & Pump Manufacturers
NEWBURY, Berks.

FM

TINPLATES

BEST CHARCOAL PLATES FOR GAS METER AND DAIRY PURPOSES
DEEP STAMPING QUALITY FOR CROWN CORKS
DEAD FLAT PLATES FOR PAINTING AND CAN-MAKING
SPECIAL QUALITY IN AMERICAN FINISH

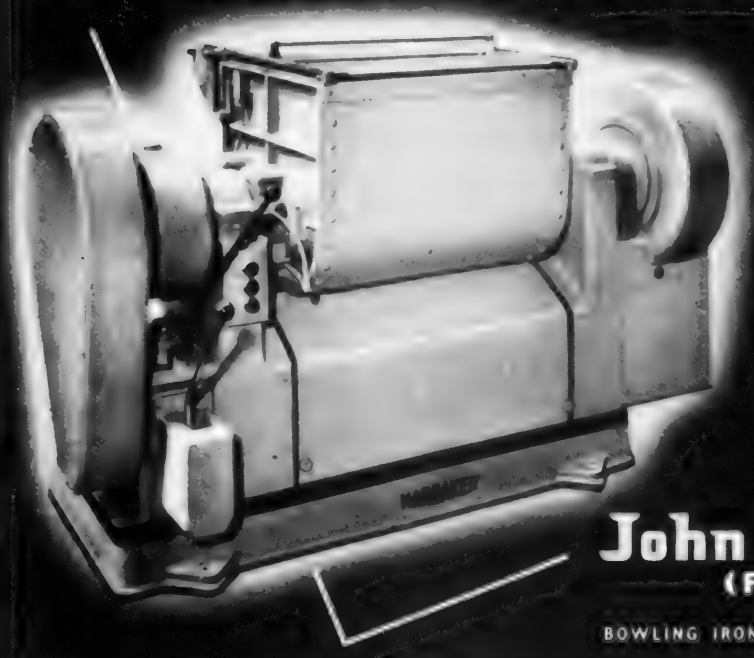
BRANDS:
"SANDOWN" and "HENZA ♠" (Cokes);
"AMFIN" (Special Cokes)
"PERSISTENT" (Charcoal).

We Specialise in
TERNEPLATES, BLACKPLATES, SHEETS BLACK & GALVANIZED, STEEL PLATES, Etc.

Telegrams:
"Persistent." Liverpool
"Persistent." Rand, London
Telephones
Liverpool, Central 2995 (3 lines)
London, Temple Bar 0077 (2 lines)

All Enquiries to—
EVERITT & CO. LIMITED
HEAD OFFICE:
40, CHAPEL ST., LIVERPOOL, 3
BRANCH OFFICE:
BRETTENHAM HOUSE, 5/6, LANCASTER PLACE, STRAND, LONDON, W.C.2

Power Performance



MODEL 24–C
30 GALLON
CAPACITY
TWO SPEED
HEAVY DUTY
MIXING
MACHINE
BY

HARDAKER

Makers & Designers
of Quality Machines
For The Food Industry

John T. Hardaker
(FOOD MACHINERY) LTD.

BOWLING IRONWORKS · BRADFORD · YORKSHIRE

Manufacturers of Crude Degummed

SOYA BEAN OIL

For prices and particulars apply to :

SOYA FOODS LTD., 40 ST. MARY AXE, LONDON, E.C.3.

Telephone : AVEnue 4971

"FETCH THE QUINCABEL !!"

Colds are a nuisance to everyone, and the discomfort and inconvenience are aggravated when, as inevitably happens, there is widespread absenteeism.

To combat this we suggest you keep in stock our "QUINCABEL" Cold Mixture, and make sure employees take it at the first indication of that wretched condition known as "a Cold".

We feel certain you will be very pleased with the results. We find it very effective, minimising the effects and duration of employees' colds.

Prices (including Tax): Postage extra:

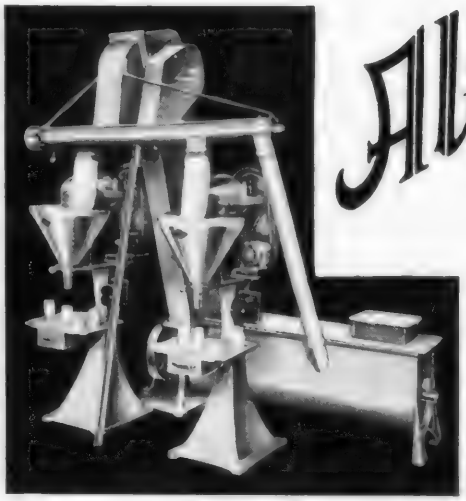
4 oz....3/1½d. 8 oz....5/4d.

1 lb.*...7/7d. (*plus container, returnable)

SEND POSTAL ORDER FOR SAMPLE 4 oz....3/9d. (including Tax & Postage)

Cuxson Gerrard & Co. Ltd.

OLDBURY, BIRMINGHAM



Alite

The Alite Distributor Elevator Unit

A Compact Unit to Provide Bulk Supply to one or two Filling Machines and Specially Designed for Single Floor Factories

ALITE MACHINES LTD

Manufacturers of Filling, Sifting and Mixing Machines

PIXMORE AVENUE, LETCHWORTH, HERTS

Telephone: Letchworth 965-6

WHITE FLINT
GLASS CONTAINERS
OF
Quality
• Pint and ½ pint Vinegar Bottles, 1 lb. and ¾ lb. Jam Jars all to agreed F.M.F. Specifications.
• Prompt delivery from stock.
• Packed in easily handled cartons.
• Wholesale only.

TRADE N MARK

NATIONAL GLASS WORKS (YORK) LTD.

KEEP YOUR FACTORY CLEAN BY IMMEDIATE INCINERATION OF ALL DIRT AND WASTE MATERIAL

We can supply Incinerator Plant to meet all requirements

THE

INCINERATOR COMPANY LTD

BELGRAVIA CHAMBERS, 72 VICTORIA STREET

LONDON, S.W.1

TELEPHONE: RELIANCE 1423 ESTABLISHED 1835

STERILIZE THE SURE WAY IN A WALLER RETORT

No canned goods will keep indefinitely unless properly sterilized.

For proper cooking and efficient sterilization install a WALLER'S RETORT as supplied to all the leading Preservers for Meat, Fish, Fruit and Vegetables.

BRITISH MANUFACTURE

WALLER & CO. LTD.

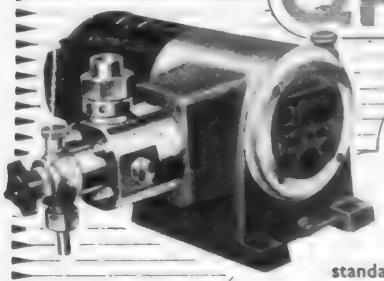
28-44 Vauxhall Walk,
LONDON, S.E.11

Canister Machinery, Press Tool Makers and Stampers.

Whenever in food industry lightcoloured and pure syrups are required
Waterwhite and brilliant liquors!
NORIT
Highly Activated Decolourizing Carbon
will give best results There is a grade to suit every purpose!
United Norit Sales Corporation Ltd., Amsterdam
Representation in United Kingdom
Haller & Phillips Ltd - London E.C.2
14, Wool Exchange Basinghall Street
Telephone MONarch 9041/2

for EFFECTIVE Emulsification

HOMOGENISERS
HAND, BELT OR MOTOR DRIVEN

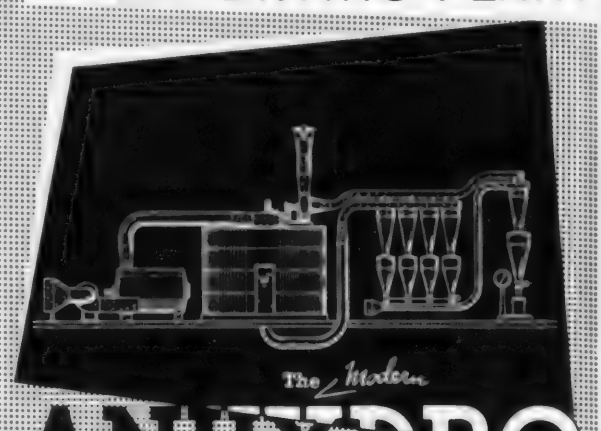


The new Q.P. Homogeniser ensures stable consistency at a high standard of emulsification. Rugged construction. Totally enclosed gear box. Easy to clean. Simple to operate. Low in cost. Illustrated is the well-made 10 g.p.h. model.

Write now for details, technical data, prices, etc.

ORMEROD ENGINEERS LTD
SHAWCLOUGH ROCHDALE

SPRAY DRYING PLANT



The Modern
ANHYDRO
system

TYPE 2 (as illustrated) for the drying of Milk, Eggs and Proteins, Coffee Extracts, Bananas, Drugs, Tannic Acid, Soap and Synthetic Washing Agents, Blood and Blood Products and many other products. Rotating atomiser, cylindrical drying-chamber with flat bottom, oil- or steam-heated air-heater. All the powder is taken by the air to a dynamic cyclone filter separating the powder into a silo.

Ask for details about the multiple advantages of the ANHYDRO plant, such as:

- Improved powder quality
- Small fuel consumption
- Moderate space demands
- Simple operation
- Easy Cleaning
- Low Operational Costs

The ANHYDRO Range also Covers:
Flash Drying Plants / Vacuum Evaporating Plants
Industrial Air-Heaters

ANHYDRO A/S, 48, Nørregade, Copenhagen K, Denmark
Telegrams: ANHYDRO Copenhagen — Telephone: Minerva 4702

Stainless Steel Lined Vessel with double acting Stirring Gear for Margarine Manufacture.

Stainless
EQUIPMENT
for food processing

We have a fine range of standard utensils, fitments, etc., for use in the food industry. Your enquiries regarding these, or for equipment made to requirements, will receive prompt attention.

SPECIALISTS IN THE FABRICATION OF
STAINLESS STEEL, MILD STEEL, MONEL METAL & ALUMINIUM

Associated Metal Works
(GLASGOW) LTD.
30 ST ANDREW'S SQUARE, GLASGOW, C.1
Phone: BELL 2004/5 *Grams:* "STAINLESS, GLASGOW"
LONDON: 7 GROSVENOR GDNS., S.W.1
Phone: VICTORIA 1977/8

Food Hygiene

USE STAINLESS STEEL EQUIPMENT IN YOUR FACTORY

MEAT, FISH, POULTRY PREPARATION TABLE. Size 18ft. × 3 ft. with 4 in. raised sides. (As supplied to Messrs. W. H. Smart & Co. Ltd. the well-known Birmingham bacon and food factory and many other reputable factories.)

STAINLESS STEEL TABLES made in all sizes.
FOOD TROUGHS · MIXING BOWLS · BUCKETS

J. & R. (Butchers) Supplies Ltd.
235 NEWLAND AVENUE, HULL
Telephone: Hull 8370 *Tel. Add.:* "Spices, Hull"

Here is an all-purpose bactericide . . .

MARINOL
TRADE MARK

Five big advantages go to make Marinol the first name in bactericides. It has a wide anti-bacterial spectrum . . . is non-toxic, non-corrosive, non-irritant. Moreover, it is a deodorant without an odour. It is powerful. And if you want it with a detergent action as well, simply write MARINOL-D on your order.

A BAYER Product

Marinol is manufactured by Bayer Products Ltd., who for many years have supplied the finest of fine chemicals to industry at home and overseas.

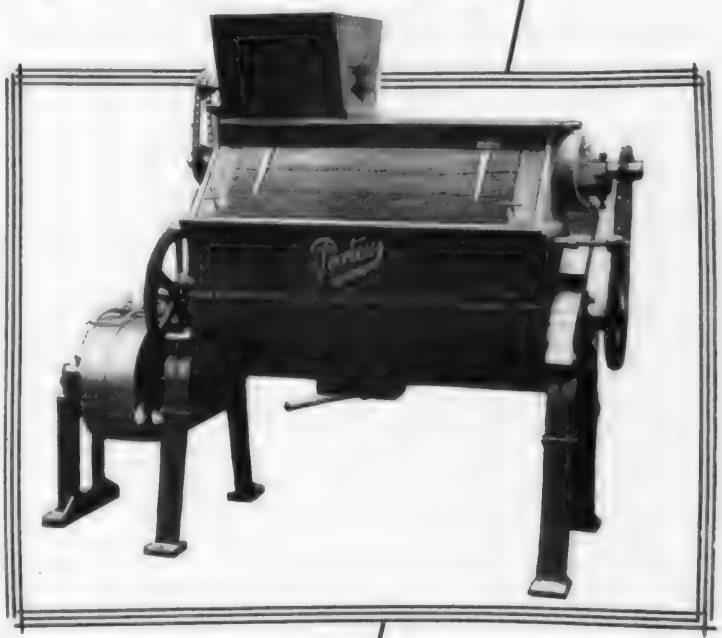
BAYER **PRODUCTS LTD.** *NEVILLE HOUSE, KINGSTON-ON-THAMES, SURREY*

Associated export company: WINTHROP PRODUCTS LIMITED

ATLAS SIFTERS AND MIXERS

ideal for self-raising flour, powders etc.

The highest possible yield with the lowest operational costs combined with perfect blending in the minimum time make the Atlas Sifter and Mixer a popular choice. Designed by Porteus experts and built by Porteus craftsmen, the Atlas range of sifters and mixers represents the very best in economy and efficiency of operation.



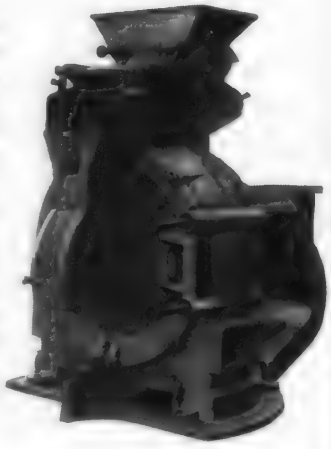
PORTEUS

GEORGE PORTEUS & SONS (LEEDS) LIMITED
LEEDS BRIDGE WORKS · LEEDS 10

GP 124

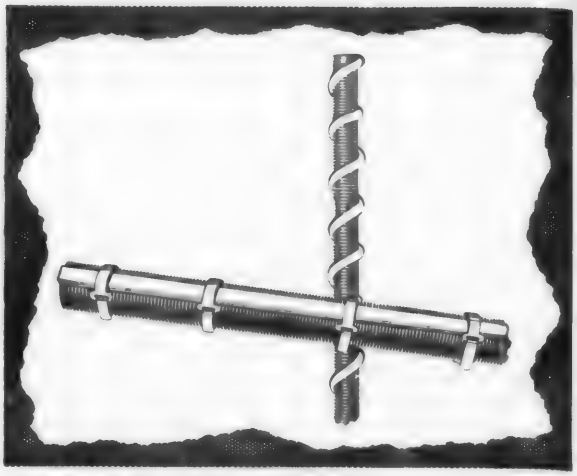
BARRON
GRINDING MILLS

Mills for the reduction of all types of materials in food manufacture. Illustrated is our No. 3 size Impact Grinder complete with feeder and suitable for grinding all types of dry materials such as sugar, cereals, roots, spices, etc., to a fine powder. These mills are available in five sizes to deal with capacities of from a few cwts. to 7 or 8 tons per hour.



W. S. BARRON & SON, LIMITED

Phone: 21055 **GLOUCESTER** Cables: Barron, Gloucester



PIPE HEATERS

(Pat. applied for)

Electrothermal Pipe Heaters are available to maintain the free flowing of viscous liquids, to prevent freezing, and for other applications where it is necessary to ensure smooth rate of flow. They may also be used immersed.

Please request leaflet.

Waterproof • Flexible • Economic • Efficient

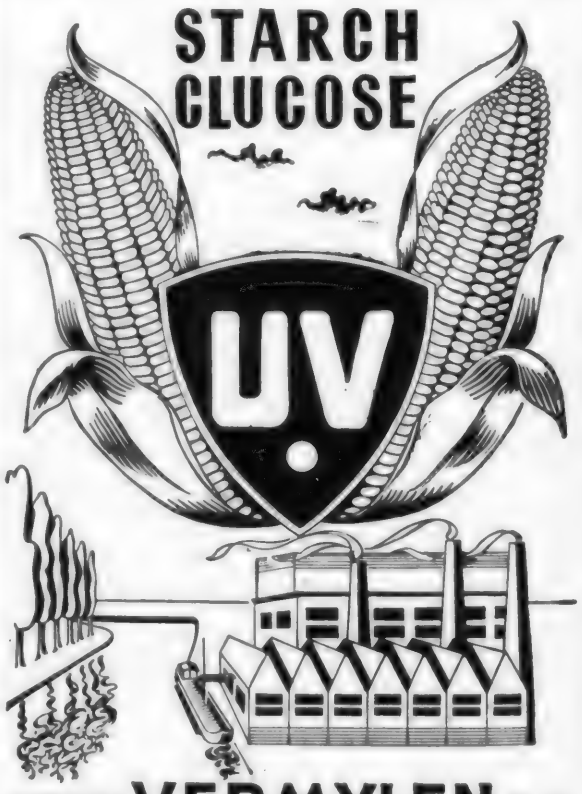
Electrothermal Engineering Ltd.

275 NEVILLE ROAD, LONDON, E. 7. Telephone GRAngewood 8888

FENNER TORQUE-ARM SHAFT MOUNTED SPEED REDUCERS
B I F
CASTLE BROMWICH BIRMINGHAM
FENNER V-BELTS
SEE FENNER FIRST
STAND D.406
FOR LATEST POWER TRANSMISSION DEVELOPMENTS
On Stand D.406 we shall be exhibiting a range of power transmission products including the new Torque-Arm Shaft Mounted Speed Reducers
FENNER V-BELT DRIVES WITH TAPER-LOCK PULLEYS
HAINSWORTH VARIABLE SPEED DRIVES

FENNER
OF HULL

LARGEST MANUFACTURERS OF V-BELT DRIVES IN THE COMMONWEALTH



USINES VERMYLEN S.A.
• BAASRODE • *Belgium* •

Seeing is believing...

The importance of industrial hygiene and all that it entails in factory cleanliness was realised by food manufacturers long before their counterparts in other sections of industry. That they should be the first to insist on dustless grinding is therefore hardly surprising but no less commendable for all that. The No. 1 KEK mill illustrated is one of many engaged in grinding granulated sugar to icing. During the operation dust is not merely minimised, it is eliminated. KEK rotary valves on the bin outlets control collection of the product while the air release tubes are enclosed by sheet metal sheaths.

If you are looking for, *Genuinely Dustless Grinding Plant* combining *MINIMUM TEMPERATURE RISE* with *Easy Cleaning* and *Cheaper Maintenance* yet entailing a *Comparatively Small Initial Outlay* then *Contact Kek Immediately*

KEK LTD

PALMERSTON STREET · ANCOATS · MANCHESTER

PURDY LABELLING MACHINES

ADVICE FREELY GIVEN ON YOUR LABELLING PROBLEMS

"JUNIOR"

The Purdy "Junior"—in extensive use throughout industry—is the smallest of the large Purdy family. It is an automatic hand-fed machine designed to apply one or two labels to round or rounded containers such as bottles, jars, cans, etc. The illustration shows a bottle having just a simple BODY LABEL applied. This model can also be fitted to apply a TOP STRAP to any bottle, or a Sealing Strip to any carton within its range. Output of course varies according to the work handled, estimates being given when samples of such are submitted to us.

THE EXPERIENCE OF HALF A CENTURY IS AT YOUR SERVICE

PURDY MACHINERY CO. LTD.

'Phone & 'Grams: ROYal 8401

ASSOCIATED WITH FARROW & JACKSON LTD.

41-42 PRESCOT STREET, LONDON E.1

The answer to most power transmission problems —

Totally enclosed gear units are a safe, quiet and reliable means of power transmission. In many cases standard units from stock can be applied. Ask our engineers for practical information.

WISEMAN ALFRED WISEMAN & CO. LTD.
GLOVER STREET, BIRMINGHAM, 9
London Office: CARLISLE HOUSE, 8 SOUTHAMPTON ROW, W.C.1

CODING?

YOUR PROBLEM

SOLVED

in plain characters

Whether it be labels, cartons, wrappers or complaint slips—Perforation provides the answer.

in code

There are small hand models with outputs of 5,000 labels per hour, or treadle and power models giving outputs of up to 30,000.

Or perhaps you prefer edge-notching by 'Codedge' — output 2,000 per minute.

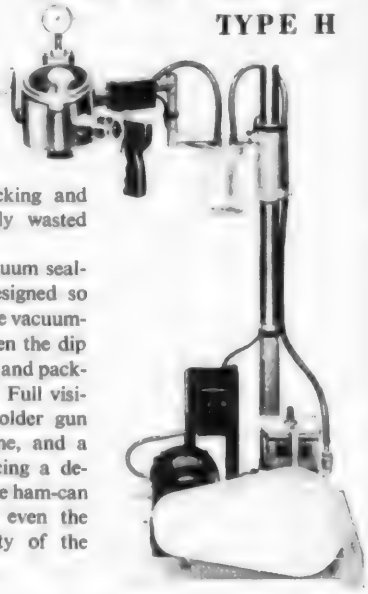
Send for full details from the Makers

SAUVEN PERFORATING MACHINE CO.

13, HATTON WALL, LONDON, E.C.1
Telephone: CHANCERY 3413

VACUUM EQUIPMENT *for* HAM CANNING

TYPE H



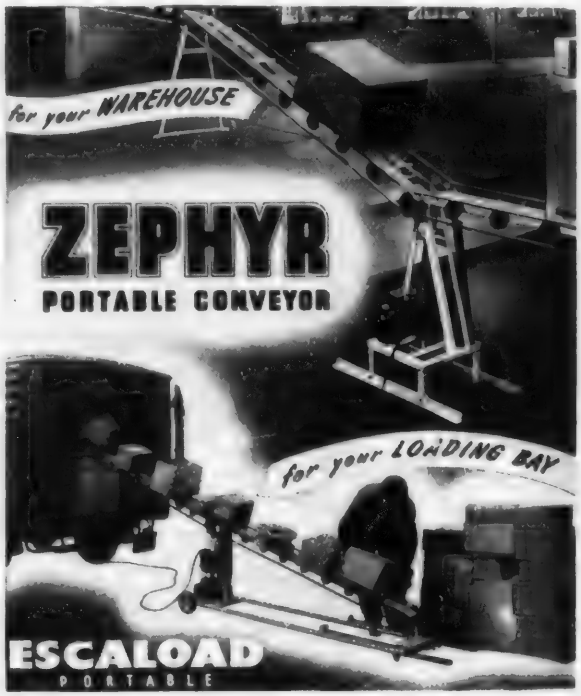
The loading and unloading of cans into drum type vacuum machines and the consequent stacking and unstacking is largely wasted labour.

The TYPE H vacuum sealing machine was designed so that each can may be vacuumised in transit between the dip soldering of the end and packing into the retort. Full visibility, pistol grip solder gun with solder magazine, and a capability of producing a degree of vacuum in the ham-can completely beyond even the theoretical possibility of the drum type machine.

We make a full range of canning machinery. Please write for details.

PREMIER FILTERPRESS COMPANY LTD.
GROSVENOR CHAMBERS · WALLINGTON · SURREY

Telephone:	*Telegrams:*	*Cables:*
Wallington 5572	Filtering, Souphone, London	Filtering, London



PUT IT WHERE YOU WANT IT. Self lubricating—absolutely clean. Send for Folders from the Manufacturers!

REYNOLDS & GRAYER LTD., Thomas Street West Bromwich. Telephone: West Bromwich 0994

WhiteAd 3179

'ON THE RIGHT TACK'

The way tape sticks can spell success or disappointment. Consistency in 'tack' is as important to the protection of your goods as the materials from which you make, blend or prepare them. Gosheron tapes are made in the right 'tacks' to fulfil the most exacting needs. Let us examine your problem with you.

Gosheron

TAPES

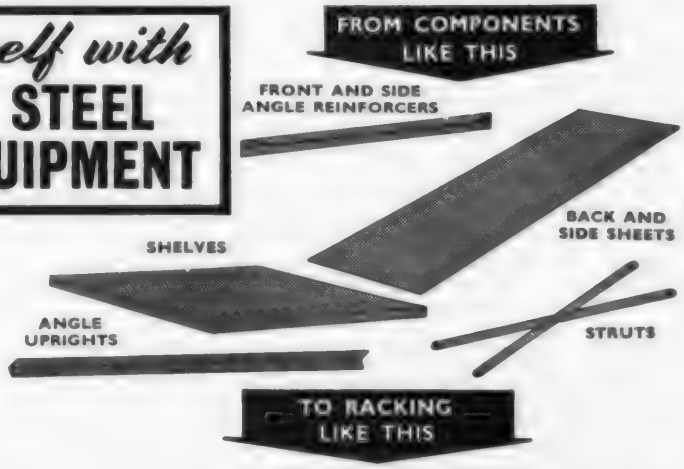
HAVE THE RIGHT 'TACK'

JOHN GOSHERON & CO LTD GAYFORD ROAD LONDON W12

SHEpherds Bush 3326 & 6271 (seven lines)

Erect it yourself with

ABIX ADJUSTABLE STEEL STORAGE EQUIPMENT



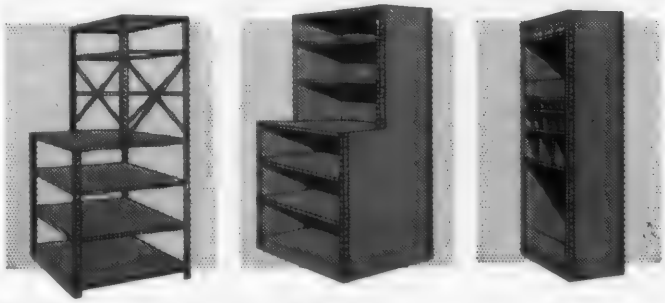
THE EFFICIENT INEXPENSIVE ANSWER TO ANY STORAGE PROBLEM!

ABIX STEEL STORAGE EQUIPMENT is supplied in a number of INTERCHANGEABLE Standard Components: from these an infinite variety of racks can be assembled easily and rapidly by unskilled labour. The components are stove enamelled Olive Green whilst all fixing bolts are galvanised or sheradised.

Nominal Standard Dimensions:
Heights, 75", 87", 99", 111", 123".
Widths, 24", 36", 48".
Depths, 9", 12", 18", 24", 36", 48".

Write today for descriptive Brochure to:

ABIX (METAL INDUSTRIES) LTD.
Factory Equipment Specialists



TAYBRIDGE HOUSE, TAYBRIDGE ROAD, LONDON, S.W. 11

Phone: BATtersea 8666/7. **Grams: ABIX, BATT., LONDON**

Gums & Resins

DAMAR·MANILA
KARAYA·ACACIA
SHELLAC·BENZOIN
TRAGACANTH

DIRECT IMPORTERS

M. HAMBURGER & SONS

LIMITED

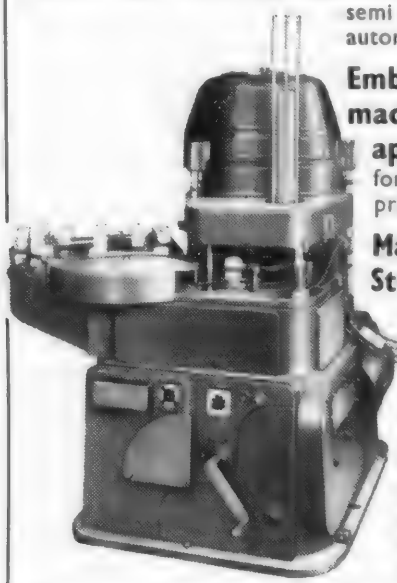
Plantation House, Mincing Lane, London, E.C.3

Telephone: MANsion House 4485 (3 lines) Telegrams: Homaclon London

---

Can closing machinery
of all kinds and sizes with and without automatic feed for lids.

Beer can closing machinery,
semi and completely automatic.



Embossing machinery and apparatus
for stamping and pressing lids.

Mashing and Straining machines
—vertical for universal motors.

Evacuating equipment
for vacuum packing of cans and jars.

Three Spindle Seaming Automatic—Model VVst

CLEMENS & VOGL

Brunswick, Germany

?

ARE YOU

BANDY-MINDED

RUBBER BANDS of suitable size and strength can cut costs considerably and speed up production. In almost every industry rubber bands can be used to great advantage. We will gladly suggest ways in which rubber bands can save your time and money. Simply write or 'phone for samples, details and ideas to

COOMBS of WIMBLEDON

Sole makers of 'STANDARD BRAND' Rubber Bands
(Please mention this paper)

H. A. COOMBS LIMITED
Standard Works, Richmond Road, Wimbledon, S.W.20
Phone: WIM 6555 *Grams:* Absentment, Wimble, London
and at: **30 HYDE ROAD, MANCHESTER, 12** *Phone:* Ardwick 6012
40 WEST NILE STREET, GLASGOW, C.1 *Phone:* Central 3343

Products are CONSISTENTLY good if they are sifted by BEGG COUSLAND'S

STAINLESS STEEL WIRE GAUZE

BEGG, COUSLAND AND CO., LTD.
SPRINGFIELD WIRE WORKS, GLASGOW, S.E.

The most efficient machines for the packaging of

BUTTER, MARGARINE
CHEESE
ICE CREAM

and all kinds of Food Products.

Automatic Moulding and Wrapping Machines for Butter, Margarine, Lard, etc. Various types for production from 30 to 120 packets per minute.

SPECIAL AUTOMATIC MACHINES FOR THE FOOD TRADE

KUSTNER

Complete Packing Installations supplied to the leading Firms throughout the world.

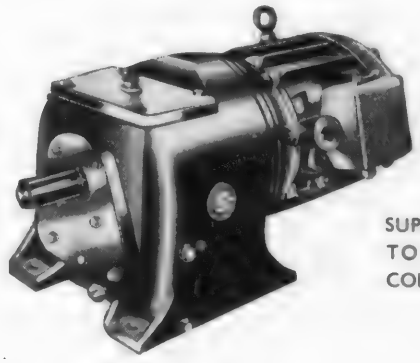
KUSTNER BROTHERS & CO., LTD., ENGINEERS, GENEVA, (SWITZERLAND)

GEARED MOTORS - SPEED REDUCERS

WE ARE GEARED TO MEET YOUR REQUIREMENTS

Unsurpassed for:

* QUALITY
* SPEED RANGE
* ALTERNATIVE TYPES
* HORSEPOWER RANGE
* SERVICE



SUPPLIED AS STANDARD EQUIPMENT TO NUMEROUS LARGE INDUSTRIAL COMPANIES HAVING HOUSEHOLD NAMES

Electropower Gears Ltd

KINGSBURY WORKS, KINGSBURY ROAD, LONDON, N.W.9

Telephone: COLindale 4621-3 Telegrams: LEKTROPOWA, HYDE, LONDON

PRESENTING

✱ LIDANO CREAM POWDER

PURE SPRAY DRIED CREAM

for use in all high quality recipes. Available with Butterfat contents 40 - 50 - 60 - 70 - 80%.

LIDANO CREAM POWDER:

- ✱ High keeping quality.
- ✱ Uniform consistency.
- ✱ Convenient for chocolate and candy manufacturers.
- ✱ No waste.
- ✱ Special recipes on request.

Samples and offers on application.

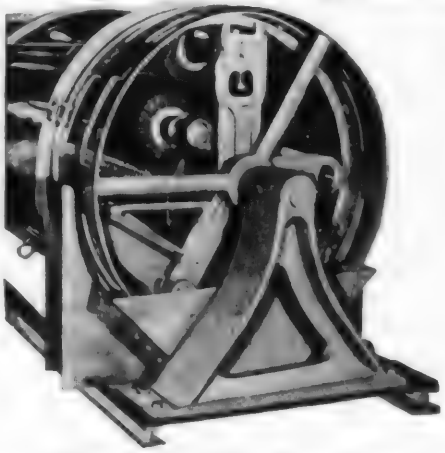
A/S LIDANO

36, NØRREGADE, COPENHAGEN K, DENMARK

Cables: Lidano Copenhagen

GOLIATH

Pea and Bean Selecting Machine



Manufactured by M. J. de Goeje, Zaandam, Holland.

- Separates 18 cwt. per hour.
- Regulated Feeding.
- Does not require supervision.
- Dimensions 14′ 6″ × 4′ 6″ width 3′ 6″.
- Runs continually for 24 hours a day.
- Can be easily and quickly cleaned.
- Obtainable in two sizes.
- Reasonable delivery date.
- Purity: highest possible.

ALL ENQUIRIES TO SOLE AGENTS FOR THE UNITED KINGDOM.

F. BOS LTD.

Gedney, Spalding, Lincs.

Tel.: LONG SUTTON, LINCS. 2232.

For Bulk Supplies insist on

BEAR Brand HONEY

Available in 7 lb. and 56 lb. tins and in barrels.
Also supplied in ½ lb. and 1 lb. jars.

The cream of the world's honey crops

L. Garvin & Co. Ltd., Isleworth, Middlesex. Tel.: HOUnslow 3483

Colours?

You may have some problems with regard to your Colours. May we submit samples or suggestions? Any colour supplied that conforms to the recommended list of the Ministry of Food Committee.

Most of our Essences are really good — why not try one or two?

THE CONFECTIONERS' VEGETABLE COLOURS & FRUIT ESSENCES CO. LTD.

MESSINA WORKS, 43a WHITE POST LANE, HACKNEY WICK
LONDON, E.9

Tel: Amherst 2274

To save time and labour, use . . .

ANKER LABELLING MACHINE

FOR SIMULTANEOUSLY AFFIXING TWO OR THREE LABELS

and

CLAYTON QUICKA HYDRO JAR WASHING & DRYING MACHINE

OUR ADVICE AND ESTIMATES WILLINGLY GIVEN

Sole Agents for the Confectionery Trade:

FRANK KEMP LTD.

223-6 FINSBURY PAVEMENT HOUSE, 120 MOORGATE, LONDON, E.C.2

Craftsmanship in

STAINLESS STEEL

Tailor-made plant and equipment in stainless steel calls for craftsmanship and knowledge far beyond the usual.

Giusti craftsmanship is hard won over many years of experience—it is ready to serve you with the quality of work you need.

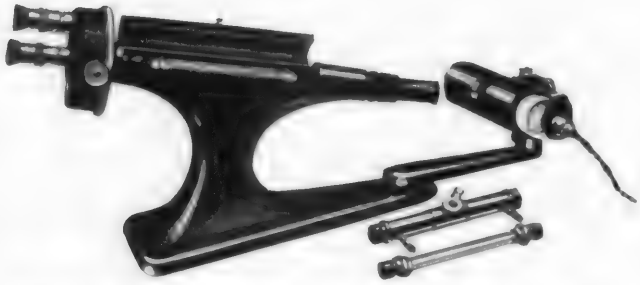
Quotations without obligation.

A screw-type conveyor built in stainless steel by Giusti. Can handle liquids such as thick sauces and fruit pulps or even powders and granules.

GIUSTI

Plant and Equipment Engineers to the Chemical and Food Industries

T. Giusti & Son Ltd., Belle Isle Works, 210/212 York Way, Kings Cross, N.7. Telephone: NORth 5021



PRECISION BS INSTRUMENTS

Polarimeter Model D

Angular or angular-and-sugar scales can be provided. For tubes up to 220 mm. length. For use with electric sodium light.

Now fitted with a glass circle and divided drum, replacing the usual verniers.

Bellingham & Stanley Ltd. DEPT. FM, 71 HORNSEY RISE, LONDON, N.19

PHONE: ARCHWAY 2270

CONVEYOR BANDS
(FABRIC)

MOP CLOTHS
For Fruit Cleaning Machines

THE KLEENKUT BINDINGS CO. LTD.
89 BARTHOLOMEW CLOSE, LONDON, E.C.1
Tel.: MON 5678/9

IMPORTERS AND SOLE AGENTS FOR U.K.:

ANGLO-ITALIAN PRESERVES LTD.
(FORMERLY EXPRESS IMPORT CO.)
30 STOCKWELL PARK CRESCENT
LONDON, S.W.9
Phone: BRIxton 4020 and 8837 *Grams:* RUFMAZ, CLAPROAD, LONDON

"USE TANZI FOR PERFECT PRODUCTS"

TANZI CALISTO & FIGLI
(COLLECCHIO) (PARMA) (ITALY)

Manufacturers of High Quality

TOMATO PUREE
AND
PEELED PLUM TOMATOES
ALSO
ITALIAN PARMESAN CHEESE
NINO COCCONCELLI BRAND, PARMA.

All sizes of 1954 pack available

Quotations for forward shipment c.i.f. or landed duty paid U.K. port.

SACK CLEANER
and Dust Collector Combined

Makers of:
Bucket Elevators
Worm Conveyors,
Separating Sieves,
Friction Sack Hoists,
Sack Cleaners,
Herb Rubbing Machines,
Vertical Mixers

F. STACEY & Co. Ltd. Lion Works, Vauxhall, St., Birmingham, 4.
Aston Cross 3721 (7 lines)

FULLER HORSEY
SONS & CASSELL

Specialists in the Sale & Valuation of

FOOD MANUFACTURING PLANTS OF EVERY DESCRIPTION

Since 1807

10 LLOYDS AVENUE · LONDON · E·C·3
TELEPHONE · ROYAL 4861
Rathbone

HAWKER & Co.
120 PENTONVILLE RD, LONDON N.1
PHONE TER 4886

CAREFUL HANDLING

As important on the packing line as in the delivery "pipeline". Backed by lashings of experience, too, it ensures safe delivery wherever British exports go. Pack your next machine on the right line.

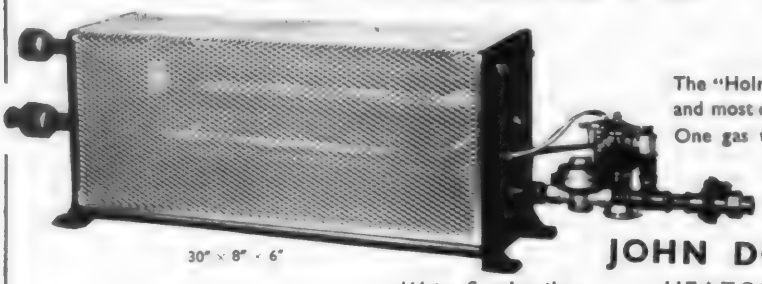
QUEEN'S ROAD, PECKHAM,
LONDON, S.E.15
Tel. New Cross 0224

EVAN COOK'S PACKERS LIMITED

ENAMELLED CHEMICAL PLANT
by
T. & C. Clark & Co. Ltd
Wolverhampton

Clark
CHEMICAL PLANT

use the HOLROYD DEFROSTER



for your cold room

The "Holroyd" defroster is the latest, simplest, cheapest and most efficient defroster available.

One gas tap and one by-pass valve only for defrosting. Defrosting completed rapidly. Dry coils ready for re-freezing. Negligible rise in room temperature. No emptying the refrigerator for defrosting.

JOHN DOWNTON (ELECTRIC) LTD.

Write for details to HEATON WORKS, POTTER STREET, Nr. HARLOW, ESSEX.

Your enquiries are invited for:—

EDIBLE OILS & FATS
(Including HARDENED OILS)
PURE REFINED LARD
SOYA LECITHIN
LOCUST BEAN GUM
GLYCERINE B.P.
AGAR AGAR
and Allied Products

Please contact—

FATOILS LIMITED

91-93 BISHOPSGATE, LONDON, E.C.2

TEL: LONDON WALL 5047 INTL TELEX: 8519

DIRECT IMPORTERS

REQUIRED

IN THE LONDON AREA

MODERN FACTORY

WITH CLEAR SPACE
OF 15,000 SQUARE FEET UPWARDS

FOR FOOD MANUFACTURE

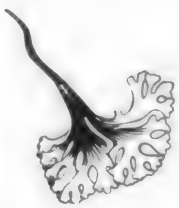
FREEHOLD PREFERRED

CHAMBERLAIN & WILLOWS

23, MOORGATE, LONDON E.C.2

CITY 0013 (8 lines)

NORSK GELATAN



Pure extract Carrageen-Moss

"Norsk" Gelatan is a Stabilizer, thickener and gelling agent, with a unique ability to produce viscous solutions AND gels!

"Norsk Gelatan" is a pure Carrageen-Moss extract with CONSISTENT ideal properties. We invite you to carry out side-by-side tests against your present ingredients:

Send for FREE SAMPLE and descriptive pamphlet to:

FINCH & KNIGHT Ltd.
BRACKNELL, BERKSHIRE

WOVEN WIRE

F. W. POTTER & SOAR LTD.

Our range of Weaving covers all grades from the **FINEST WIRE CLOTH** to the **HEAVIEST SCREENING.**

Also makers of
SIEVES
SCREENS
DRESSING COVERS
TRAYS
BASKETS
and many other Wire Products.

Write for our brochures of Woven Wire and Wirework.

PHIPP STREET
LONDON E.C.2

Telephone · BIShopsgate 2177 (3 Lines)

FRESH FRUIT AND PULPS

Send your enquiries to the **Producers**

THE BEDDINGTON NUT & PRODUCE CO. LTD.

HIGHLANDS HILL, SWANLEY, KENT

Telephone : Swanley Junction 2306/7

Telegraphic Address : "Namsoluc, Swanley Orpington"

SITUATIONS VACANT

TIME and Motion Study Engineer required by old established and progressive Chocolate and Sugar Confectionery manufacturers in the London area. Applicants must be between the ages of 25 and 35 and possess sound education and practical experience.—Please reply, giving full details of age, education and salary required to Box B4925.

TECHNICIAN required with broad experience of the characteristics of modern packaging materials to advise on their utilisation. Applicants must have good all-round experience and knowledge of paper, films and adhesives. This is a senior appointment with a progressive and expanding packaging company and commencing salary will be dependent on previous experience. Excellent prospects for man prepared to use initiative. Applicant must be prepared to reside in the North of England. Contributory Pension Scheme.—Apply in writing giving details of age, education, experience (all applications treated in the strictest confidence) to Box 4. Q. 2371, A.K. Advg., 212a, Shaftesbury Avenue, London, W.C.2.

FOOD Manufacturers in the South of England have vacancy for an Assistant/Trainee to the Works Manager. Applicants should have a knowledge of Dairy Chemistry, and be interested in automatic packing machinery and production efficiency. The post calls for a young man who has completed National Service, and who is prepared to work and study an industry offering good prospects to the right person.—Write Box 12791, C. Vernon and Sons Ltd., 17/19, Stratford Place, London, W.1.

COST Accountant (A.C.W.A.) required by Fruit and Vegetable Canners and Jam Manufacturers in a West Midlands county town. Experience desirable but not essential in industry where production is subject to seasonal variations. Age not over 35. Salary not less than £700 per annum. Free house provided in near future. Contributory pension scheme. Interviews may be arranged in Birmingham area at week-end.—Box B4931.

CHEMIST required for control of Edible Oil Refinery and development of plant. Must be experienced in continuous refining and votator method of processing. London area. —Box B4932.

FOOD Processing and Packing in the Tropics. Experienced Factory Manager required for extensive modern plant producing range of quality food products for export in bulk and retail packs. This most responsible post calls for man of highest integrity, leadership, initiative, organising and administrative ability, capable of inspiring staff and factory hands with enthusiasm and team spirit. These qualities more important than high academic or technical qualifications but really good practical experience of factory management and hygiene, modern processes of food manufacture, canning, etc., essential. Engineering background an advantage. Superannuation Scheme, generous leave, first-class passages self and family, house, good salary and prospects for the right man.—Apply giving fullest particulars all previous experience in confidence to Box 493, c/o Smiths', 100, Fleet Street, London, E.C.4.

PRODUCTION Manager required for progressive Canners opening New Cannery in Outer London Area. Good all-round practical man well experienced in production of canned fruits and meats.—Box B4941.

YOUNG Chemist required by progressive firm of Canners for their Scottish Canneries. Experienced Quality Control in Fruit and Vegetable Canning. Excellent opportunity for single man.—Reply in strict confidence with full details and salary range Box B4936.

FOOD Technician (Executive level) required for old established South of England business. Experience in manufacture of starch food powders, table jellies and kindred lines very desirable. Ability to extend range of products by creation of new lines is an essential requirement. Initiative, inventiveness and native ability are more important than professional qualifications. Substantial remuneration available to first-class man. Applications will be treated in strictest confidence by Managing Director.—Box B4916.

CLASSIFIED ADVERTISEMENTS

In FOOD MANUFACTURE

MUST BE PREPAID

4d. a word, minimum 10s.

Box numbers, 1s. extra.

Replies to

BOX NUMBERS

should be addressed to

Food Manufacture, Stratford House, 9 Eden Street, London, N.W.1

SITUATIONS WANTED

GENTLEMAN war disabled, 10 years experience food canning production seeks administrative position. Semi-sedentary or sedentary, bi-lingual (French). Owner driver. —Box B4937.

JAM Boiler seeks change, 11 years practical experience, Jams, Marmalade, Mince Meat, Table Jellies, Fruit Preserving, Pulping, Freezing, etc. Highly recommended.—Box 4631, Easons Advtg. Service, Belfast.

PRODUCTION Supervisor, 20 years experience in the manufacture of Bakers Prepared Materials, including marzipan and macaroon paste. Practical engineer. Able to control labour. Desires position with progressive company.—Box B4939.

ASSISTANT Production Manager with large food and preserve manufacturers seeks administrative position in food factory. Advertiser, aged 30, with laboratory and industrial experience holds City and Guilds Diploma in Cocoa, Chocolate and Sugar Confectionery Technology.—Box B4942.

WORKS Manager, 41, extensive experience in food industry of costing, processing, production, administration and control of works services with responsibility to Board in national concerns Possesses initiative, enthusiasm, integrity and ability to lead and enthuse others. —Box B4944.

BUSINESS OPPORTUNITIES

DE-GREASING and Cleaning Down! One man can do the work of five with B. and A. steam-cleaning-with-detergent equipment; ready for use from your own steam supply. "Speedylectric" high-efficiency steam lance; 30 ft. steam hose; 15 ft. detergent hose; £40 complete. Ideal for the Food industry.—Bastian and Allen Ltd., Leaflet L.30, Ferndale Terrace, Harrow, Middlesex.

WELL-KNOWN Scottish Pie Makers can offer attractive terms to Agents with own transport. Goods despatched to any part of the country by passenger train. Branded line, goods packed in cardboard cartons, each containing one dozen.—Trade inquiries to V. C. Pies Ltd. Glasgow. Tel.: Maryhill 1048.

FULL Steam in five minutes with B. and A. Electrode Boilers, used by British industries for twenty years. No boilerhouse, no flue, no attendant needed. The most compact and convenient steam raisers available, can go beside machines using the steam.—Write for leaflet 125, Bastian and Allen Ltd., Ferndale Terrace, Harrow, Middlesex.

The Strongest Vanilla Flavour

VANOLEUM

1 oz. (2/6) makes a pint of essence
4 ozs. 8/6. ½ lb. 16/6. 1 lb. 32/-

For further details apply:

ARTHUR WHITTAKER & CO. LTD.
30 Church St., Newton Heath, Manchester, 10

BUSINESS OPPORTUNITIES

CHELSEA POLYTECHNIC

DEPARTMENT of Botany and Zoology, Session 1954-55. A course of four lectures on Food-borne Infections and Intoxications will be given by A. W. G. Chetham on Thursday evenings at 7.30 p.m. commencing Thursday, April 28th. The course is designed for those dealing with food and sanitation. Fee for the course £1 1s.—Full particulars obtainable from the Head of Department of Botany and Zoology.

FOOD Manufacturing Firm has available Spray Drying capacity, preferably for food products. Minimum two weeks run considered.—Apply to Box B4928.

OLD ESTABLISHED Bakery Sundry business with premises in London, serving over 1,500 Bakers, Caterers and Institutions in England and Wales seeks amalgamation with a view to reduce overheads. Would consider sale.—Box B4933.

DUBLIN Sales Agents, well established and experienced, calling on food and beverage manufacturers, desire to represent British firms in Southern Ireland.—Box B4934.

QUICK FREEZING Factory for Sale or Let. Capacity 2½-3 tons daily; 8,000 cu. ft. sub-zero storage; 4,500 sq. ft. factory space, canteen and offices. Centre of fruit and vegetable growing area, 50 miles London. —Box B4935.

THE proprietor of Letters Patent No. 575160 relating to a Milk Product of Process of Manufacturing Same is desirous of exploiting the invention by way of licence or sale.—Enquiries should be addressed to Andrews and Byrne, 201, Bank Chambers, 329, High Holborn, London, W.C.1.

MEDIUM-SIZED Meat Canning house is desirous of extending sales on a national basis, but finds cost of sales representation disproportionate to volume handled. Seeks small to medium Fruit and Veg. Canner of highest integrity producing first-quality lines who face similar problems to share exclusive sales force. Might also consider Preserve/Sauce Manufacturer. Bankers and trade refs. to be exchanged.—Box B4938.

WANTED Travellers for various territories to undertake new and interesting additional line. Good commission basis.—Reply Hayes Importers, 25, George Street, Hove, Sussex.

MODERN Bakery (steel and brick), large and well equipped, weekly potential 70/80 sks bread, plus £2,000 confectionery. Fleet of vans covering wide area, mainly retail confectionery. Up-to-date Shop and Restaurant with adjacent property for expansion. Total ground area 30,000 sq. ft. Offers excellent prospects for progressive firm. Freehold, £70,000. Provincial town, south of England.—Box B4943.

ONLY the original manufacturers can really recondition a machine as new, so when thinking of buying a second-hand Purdy Labelling Machine first contact The Purdy Machinery Company, Limited, 41-42, Prescot Street, E.1, Tel.: Royal 8401, who have, from time to time, completely rebuilt and fully guaranteed machines available.

FRUIT Canning Business offered complete or the factory premises suitable other goods. Situated in excellent fruit growing area. Labour available, also good living accommodation.—Box B4876.

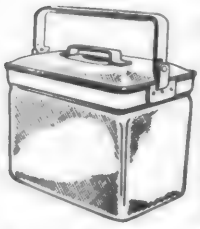
CAPITALISING RESERVES

Many Private Companies have REVENUE RESERVES which can be CAPITALISED by issuing Bonus Shares. Whilst this operation does not result in any CASH ADVANTAGE to the Shareholders, proposals can be submitted to remove this disadvantage by

REGINALD TERRELL
BUSINESS BROKERS LIMITED
46, St. James's Place, London, S.W.1
Telephone: Hyde Park 1678

MISCELLANEOUS SALES

STAINLESS STEEL VESSELS



50/- each carriage paid in dozens

55/- each plus 2/6 carriage and packing smaller numbers.

Capacity 6 gallons.

16" × 11" × 11" deep.

Complete with lid as illustrated plus inner anti-splash lid. Handle swivels flat thus securing lids when in transit.

Ex M.O.S. constructed to usual high government specification.
Radius corners, 20 gauge 18/8 stainless steel, every vessel despatched in sound serviceable condition.

IMMEDIATE DESPATCH

MYERS & FOULKES (FM)

Grove Green Road, London, E.11. LEYtonstone 1013

DRAKESONS

GENERAL METAL SPINNERS

CAPACITY UP TO 72" IN ALL METALS

SPECIALISTS IN HEAVY GAUGE HYDRAULIC SPINNING

SHEET METAL ENGINEERS

21 PARKHOUSE STREET, CAMBERWELL, LONDON, S.E.5. RODney 6060 and 6082

MISCELLANEOUS WANTS

I BUY discontinued lines, old stocks, small or large lots, canned goods, chocolates, sweets, groceries, biscuits, hardware, chemist's sundries, polishes, soap powders, fancy tins, cardboard boxes for packing chocolates, sweets.—Paul, 413, Bury New-road, Salford, 7. Tel.: Broughton 2700.

MEDICAL bottles; tablet bottles; jars; bottle closures, bakelite and metal purchased. Best prices paid.—Samples and full details in first instance to Noel Davold and Co., 9, Laurence Pountney Lane, Cannon Street, London, E.C.4. Tel.: MANsion House 3951-2.

DAMAGED or redundant stocks of food, residues or by-products in large or small quantities required.—Send your offers to Rotunda Foods Co., London Office: 50/52, Blandford Street, W.1. Tel.: Welbeck 8465.

REQUIRED redundant Wooden Boxes, Cases, Bottle Crates and Containers in large quantities.—Full particulars price etc., to Silverdale Box Supplies Ltd., Burgess Hill, Sussex. Tel.: 3485.

TO MANUFACTURERS OF PRE-PACKED FOOD LINES SUITABLE FOR THE RETAIL OR CATERING TRADE

Have you any dormant or slow selling goods that you wish to clear which are taking up valuable space? We are spot cash buyers for any quantity of the above.

Send details to:

MR. R. J. HIBBINS
ANGEL WAREHOUSE CO. LIMITED
ISLINGTON GREEN, LONDON, N.1
CAN. 3247 (10 lines)

(Please mention this advertisement when replying.)

CLASSIFIED ADVERTISEMENTS

In FOOD MANUFACTURE

MUST BE PREPAID

4d. a word, minimum 10s.

Box numbers, 1s. extra.

Replies to

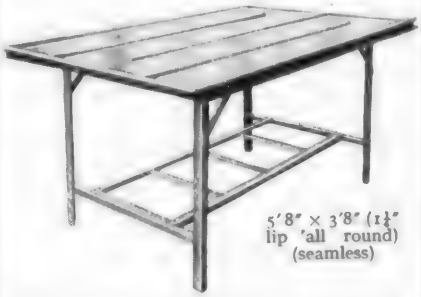
BOX NUMBERS

should be addressed to

Food Manufacture, Stratford House, 9 Eden Street, London, N.W.1

MISCELLANEOUS SALES

Factory Tables with STAINLESS STEEL TABLE TOPS



5'8" × 3'8" (1½" lip 'all round) (seamless)

Firth's Quality. "CORROSION AND ACID RESISTING THROUGHOUT." These Trays or Tops were originally designed for culturing Penicillin and are offered as being unused. They have three reeds running lengthwise; being seamless, there are no crevices into which waste materials can lodge. They are reinforced for heavy duty; undersides treated with rubberised solution to repel condensation. Each Tray weighs ¼ cwt. Large numbers used in all branches of Food Processing. The finish is Industrial Bright-gloss with very slight defects. The underframes (sectional) are mild steel enamelled grey.

Price: Table Tops, £8, c.w.o.
Complete Tables, £17, c.w.o.

THOMAS HOGG, 31 Wellington Rd., Whalley Range, MANCHESTER 16. Phone: MOS 3072

FOR SALE

CASINGS

The following lots of casings are offered, subject unsold. 950 bundles each × 22 yds., approx. of 105 m.m. Naluxin Casings inedible; 3600 packets each × 50 yds. of S.I. 19 m.m. Hypak Casings; 457 packets × 100 yds. S.I. 19 m.m. Hypak Casings. Advertiser is willing to accept offers for each of the foregoing lots which are surplus to his immediate requirements. The Hypak Casings are edible and each packet contains 9 unit spools packed in film. Offers will be accepted for all or part of the foregoing lots.

BOX No. B4915
FOOD MANUFACTURE
Stratford House,
Eden Street, London, N.W.1

MISCELLANEOUS SALES

A NUMBER of Brass Beam Scales suitable for factory use and in good condition is available at a very low price from a multiple retail organisation.—Apply Box B4929.

SUBJECT Unsold: 60 casks No. 1 Lebanese Pickling Onions, Jan. 1955 arrival, 2¼ cwt. net, £5 10s.; 30 casks, autumn 1954, seconds cauliflower, £5; 20 casks, autumn 1954, stump first-class quality, £3 5s. All prices ex-factory. Casks free.—Humber Pickle Co., Hull.

HAND Trucks, tubular steel, remarkably light and strong. Pneumatic tyres. Roller bearing wheels. Platform, 5 ft. 4 in. by 2 ft. 9 in. Carrying capacity 10 cwt. £14 2s. 6d. Immediate delivery. Write for illustrated catalogue.—Sterling Pump Co. Ltd., Spalding. Tel.: 2404.

BARRELS. 55-gall. capacity Oak and Chestnut Barrels; 40 available weekly, used once only for Vermouth.—Borden, 3, Hall Place, W.2. Tel.: PAD. 6619.

APPLES for Canning, Jam and Mincemeat. 500 tons hand-picked Bramleys, machine graded 2¼ in.-2¾ in.-3 in. to your requirements. Also Swedes and Carrots for Canning. We shall be pleased to submit keen quotations delivered to your factory in 6-ton loads on receipt of your enquiry.—Horace Sullivan Ltd., Fruit Merchants, 133, Widemarsh Street, Hereford. Tel.: 2532 (4 lines).

TEN tons Citric Acid B.P., 4 tons Tartaric Acid B.P. and 1 ton Refined Soya Lecithin 60% for sale.—Whitecourt Ltd., 21, Little Portland Street, London, W.1.

ESTABLISHED manufacturers invite enquiries for genuine Worcestershire Sauce at 13/6 gall., ex works.—Tamar Indien, Harders Road, Peckham, S.E. 15.

ONE CWT. drums Boake Roberts "Drydex" (Lemon Flavour) for sale.—Box B4917.

DRIED VEGETABLES
DRIED HERBS
SEEDS & SPICES
GROUND PAPRIKA

•

AGRICULTURAL AND CHEMICAL PRODUCTS LTD.
51 & 52 BARBICAN, LONDON, E.C.1
Telephone: Monarch 6124-6 (3 lines)

WORLD LIST OF ABBREVIATIONS

Demy 8vo. ix + 261 pages. Price 18s. net.
Postage: 6d. Home, 1s. Abroad.

THE WORLD LIST OF ABBREVIATIONS OF SCIENTIFIC, TECHNOLOGICAL AND COMMERCIAL ORGANIZATIONS is the *only book of its kind*, and will serve a useful purpose in bringing easily to hand in one volume all the abbreviations one needs to know. It is of particular interest not only to information officers and librarians, but to all those whose work brings them in touch constantly with the world's learned societies, industrial, research and technical institutions.

Obtainable through your usual bookseller

LEONARD HILL LIMITED
STRATFORD HOUSE, EDEN ST., LONDON, N.W.1.

PLANT FOR SALE

GALVANIZED semi-circular Bottle Soaking Tank, 25 in. by 56 in. insides by 3 ft. high; wooden ditto to order. Twelve-head Pontifex Filling Machine, nips to quart bottles, counter-pressure, power-driven, hand-operated, anti-clockwise; dimensions 4 ft. 3 in. by 3 ft. 3 in. by 6 ft. 3 in. high. Small spray-type Bottle Pasteurizer; will take any bottle up to 14 in.; 36 doz. pint bottles per hour; hand operated; requiring pump and steam or immersion heating; overall dimensions, 6 ft. 7 in. by 3 ft. 7 in. by 8 ft. 4 in. high. Large immersion-type Bottle Pasteurizer, 300 doz. pints per hr.; will take bottles up to 14 in.; electrically driven chains, steam heated, thermostatically controlled; dimensions, 31 ft. by 10 ft. 6 in. by 10 ft. 9 in. high.—Cooperage, High Road, N.17.

SMALL Complete Jam Manufacturing Unit, consisting of electrode steam boiler, three boiling pans complete with all pipe lines and fittings, rotary filling table, labeller, pulping, cutting, mixing and whipping machines, scales, water softener, pans, laboratory equipment; can be seen any time. Also freehold factory and offices if required. Midlands area.—Box B4926.

B.M.R. Margarine Packing Machine without motor. Machine is in excellent condition.—For particulars apply to Box B4930.

TANK, 1,000 gal., prodorite glass lined, unused.—British Chemotheutic Products Ltd., Grant Street, Bradford.

MEAT-CUTTING Electric Bandsaws. New high-speed machines for sale, stainless steel or wood table. Three sizes, 24 in., 30 in., 36 in. Max. height of cut on 36 in. machines, 19 in. 400/440/3-phase supply. Photo and prices available from makers.—F. J. Edwards Ltd., 359, Euston Road, London, N.W.1. Tel.: EUSton 4681.

TRAVELLING Oven, 30 ft. Two-pan Baker-Perkins two-speed model together with quantity of baking sheets. Overhauled 1953. Suitable confectionery, biscuit and pie making. —Apply Mason and Co., Incorporated Accountants, Weston Road, Southend.

CHOCO-MASTER Enrobers and Covering Chocolate. Your enquiries welcomed.—Sorensen's, 42, Raby Street, Manchester, 16.

BENHAM and G.E.C. electric Pastry Ovens. Single-, double- and three-deck models with intermediary shelf. Special offer. Your enquiries invited.—Sorensen's, 42, Raby Street, Manchester, 16. Tel.: MOSs Side 2054.

CREAMERY Package 400 g.p.h. s.s. Multiflo two-stage Plate Cooler. Brand new and unused.—Box B4903.

HOMOGENISERS, several sizes; also stainless steel Tanks, good condition.—Box B4893.

ONE double " Z " armed Mixer, 33 in. by 33 in. by 25 in. deep, motorised 440/3/50, with safety guard complete. One Low and Duff steam jacketed Boiling Pan, 30 in. diam. by 24 in. deep, with retractable stirring gear, motorised 440/3/50; w.p. 60 p.s.i. One brand new Morton latest model self-discharging twin-screw Mixing Machine; 10 cwt. capacity; complete with 15 h.p. 400/440/3/50 electric motor and starter. Two complete Lightfoot Refrigerating Plants, approximately 120,000 B.T.Us./hr. each; with motors 440/3/50. All in first class condition.—Box B4894.

FIVE-GALL. gas-heated Pan. Stirrers lift out of mixer; 15-gall. copper, jacketed tilting Pan, double acting stirrers; 30-gall. Monel, jacketed tilting Pan, double acting Monel stirrers; Cochran-Kirke Sinuflo G.F. Boiler, modern, fully automatic, 1,300 lb. p.h., 4 ft. 6 in. diam. by 7 ft. 6 in. high; Mikro Pulverizer, 12 in., complete grinding unit; No. 3 Kek Mill, new condition.—Box B4873.

COMBINED Sifting and Mixing Machines, sizes 5 cwt. and 3 cwt. ex stock.—Makers: D. Burr and Son Ltd., Drayton Place, West Croydon.

SECOND-HAND PLANT WANTED

BROAD Bean Podder required. Must be in good condition. Minimum output shelled beans 25 cwt. per hour.—Fullest details and price to Box B4919.

VERTICAL Hydraulic Press required for Fruit Juice Extraction. Capacity about 100 gall. per hour.—Fullest details and price to Box B4920.

SECOND-HAND PLANT FOR SALE

600

COMPLETE Vacuum Drying Plant by Scott, comprising horiz. band drier, approx. 35 ft. long by 6 ft., with service feed hoppers, shaker feeder, condensate receivers for hot-plates, vaccum augmentor, Kek mill, screening and finished material hoppers, tailings elevator, wet and dry vacuum pumps. Motorised, drier of the seven-band type, but has operated with three bands only.

Horizontal steam jacketed Vacuum Drier by Passburg, approx. 23 ft. long by 4 ft. diam., fitted gear-driven revolving reel of ten 4 in. steel tubes surrounding central tube, heated by live steam with intermediate paddles fitted for agitation; steam jacket, w.p. 2 ats.; batch type mounted on three cradles and fitted two discharge openings with lever operated doors. Complete with condenser, all fittings, horiz. wet vacuum pump.

Rotary Drier by Vernon of Paris, 30 ft. long by 4 ft. diam., constr. ¼ in. steel plate, running on two roller paths. Riveted constr. flange bolted in two halves, fitted internal flights. Driving arrangements for electric motor through girth gear and pinion. Fan, cyclone and parts of furnace available.

Seven new Twin-roll Spray Driers, rolls of chilled cast iron 40 in. long by 32 in. diam., max. 74 lb. sq. in. w.p., fitted air-cooled doctor blades, rotary disc, distribution trough, air spray jets and worm discharge conveyors. Ancillary equipment comprises stainless steel feed pump, jacketed feed tank, aluminium encased powder dresser, valves, gauges, all electrical gear for driving.

Six new Vacuum Drying Ovens of mild steel welded constr., approx. 7 ft. long by 3 ft. 6 in. wide by 3 ft. 6 in. deep, fitted nine steam-heated shelves to carry 36 acid-resisting metal trays, 36 in. long by 16 in. wide by 1⅜ in. deep. Davit swung door at each end, with hand wheel closing mechanism. Complete with motor driven horizontal wet vacuum pump, pressure and vacuum gauges, metal trays and connecting pipe.

Vertical Open Top Mixer by Kellie, 2 ft. 6 in. diam. by 1 ft. 10 in. deep, 50-gall. capacity. 16G F.D.P. Stainless steel, lined with Monel metal, coil heating and 1¼ in. centre outlet. M.S. mixer body mounted on four tubular legs, stainless steel fittings and horizontal three-arm nickel silver agitator running at 31 r.p.m. driven by A.C. motor.

Horizontal single-trough steam jacketed Mixer by Gardner, 10 cwt. capacity, 6 ft. 3 in. by 2 ft. 4 in. by 2 ft. 5 in. deep, mild steel constr., c.i. ends. Broken scroll agitator with bare shaft extension. Mounted on legs. Jacket suitable for 30 lb. sq. in. w.p. Fitted hinged cover.

Vegetable and Fruit Dicer by Brierley, Collier and Hartley, double head type, two copper containers 6 in. by 6 in. with phosphor bronze rams, copper feed tray, plungers operated through spur gear and pinion from f. and l. pulleys.

Walmar Mark V Chocolate Enrober by Walter Denis-Contacts. Water-jacketed chocolate bath fitted immersion heater and thermostat, chain-type conveyor in coating section. Air-operated rippler. Cooling section approx. 4 ft. 8 in. long mounted over 6 ft. centres, flat belt conveyor fitted canvas belt covered food grade rubber. Cooling supplied to tunnel from York Shipley self-contained refrigeration unit. Three motors and element.

GEORGE COHEN
SONS & CO. LTD.
WOOD LANE, LONDON W.12 Tel.: Shepherds Bush 2070
& STANNINGLEY, Nr. LEEDS Tel.: Pudsey 2241

SECOND-HAND PLANT WANTED

BOTTLE Washing Machine required for 4-oz. 26-oz bottles. Capacity 250/300 doz. per hour.—Fullest details and price to Box B4921.

AUTOMATIC Bottle Filler required, vacuum type, output 200/300 doz. per hour.—Fullest details and price to Box B4922.

SECOND-HAND PLANT FOR SALE

MARZIPAN Toasting Machine, gas heated, water cooling; 300 lb. Chocolate Mixing Kettle, thermostat; three-granite Roll Refiner, 28-in. rolls; 80-qt. Melvin four-speed Mixer; Young's Powder Filling Machine; 4 cwt. Barron Drum Paste Mixer.—Box B4927.

Phone 98 Staines

10-, 40- and 80-qt. modern elec. Morton Bowl Mixers. Unused portable elec. Stirring Arms, 400/3/50. (Three) No. 4 elec. " Kek " Mills, 440/3/50, 5 h.p. Heavy twin spiked Roll Crusher, 18 in. by 12 in. " Perkins " heavy twin blade Tilting Mixers, 30 in. by 30 in. by 24 in. and 28 in. by 32 in. by 24 in., 400/3/50. Twenty twin " Z " blade Mixers up to 42 in. by 28 in. by 38 in. deep. Three 750-gal. jac. cyl. Mixers, 5 ft. 6 in. by 5 ft. 4 in. deep. 2,400-gall. glass-lined Pressure Tanks, cyl. enclosed. Chocolate Kettle, 39 in. by 28 in. deep. " Dragee " Pan, 36 in. by 18 in. (elec. drive). " U " trough Mixers and Sifter/Mixers up to 7 ft. 6 in. by 2 ft. by 2 ft. Two 1-ton jac. Chocolate Mixers by " Lehmann." Disintegrators, 24 in., 22in., 18 in. and 12 in. Four-pot Conche by " Lehmann." Thirty jac. and plain Autoclaves and Ovens up to 8 ft. by 5 ft. diam. Unused elec. Pans by " Falkirk," 20 and 30 gal. 5-in. gunmetal jac. Extruder. Three Drop Rolls, 400/3/50. Pumps, condensers, boilers, refiners, dryers, hydros, mincers, filter presses, etc. Storage tanks up to 44,000 gal.—Harry H. Gardam and Co. Ltd., Staines.

GARDNER " J " size Powder Sifting and Mixing Machine, 15 cwt. capacity, fitted with brush sifter and worm reduction gearing.—Apply Box B4940.

B.C.H. 8 in. and 6 in. diam. stainless steel Pulping and Sieving Machines with stainless steel sieves. Albro four-head stainless steel Vacuum Liquid Filling Machine. Hobart and Morton 80-qt. Mixing Machines, with beaters whisks, etc. Bancroft two-head stainless steel Liquid Vacuum Filling Machine. Purdy World Bottle Labelling Machine. Beth automatic Can Labelling Machine. Phoenix Power Capping Machine for 58 and 63 mm. jars. 60-gal. stainless steel steam jacketed Boiling Pan, suitable for 40 lb. s.w.p.—Apply C. Skerman and Sons Ltd., 118, Putney Bridge Road, London, S.W.15. Tel.: Vandyke 2406.

NUMBER of Southall and Smith's automatic Weighing Machines and other food packing machinery for sale.—Box B4923.

TWO Young Patent Filling Machines with tubes for 4oz./2lb. in various weights.—Box B4918.

Reconditioned Labellers

as new . . .

Purdy Automatic and Semi-automatic.
Bratby & Hinchliffe Automatic.
Flowers Semi-automatic.
Banks Automatic.
Can Labellers.

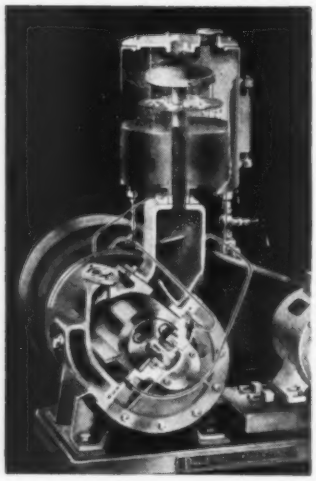
Labellers always in stock

C. SKERMAN & SONS
LIMITED
118 Putney Bridge Road, London, S.W.15
Established 1875 Telephone: VANdyke 2406/7

"Geryk" — all British

VACUUM PUMPS

FOR FACTORY OR LABORATORY PURPOSES



All Types for All Duties.

Wet and dry pumps of all sizes.

Reciprocating and Rotary Types.

Single and Two-stage High Vacuum pumps.

Pulsometer Engineering C° L^td^

Nine Elms Ironworks, Reading.

the foremost importers and dealers in dried fruits

GRAHAM & Co. LTD.

ESTABLISHED IN EASTCHEAP SINCE 1871

3 ST. GEORGE'S LANE EASTCHEAP
LONDON, E.C.3. *Mansion House 4142*
and at
8-12 RAINFORD Gdns., STANLEY ST.
LIVERPOOL, 2. *Central 4680*

SUPPLIERS TO THE WHOLESALE AND MANUFACTURING TRADES EXCLUSIVELY

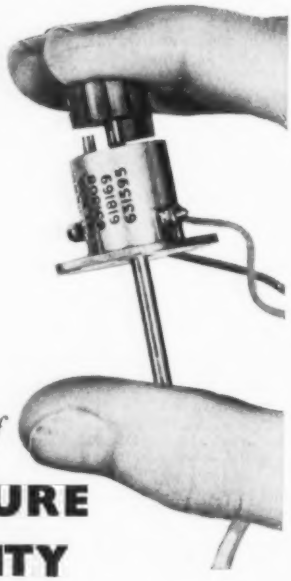
PREPACKED FRUITS UNDER OWN OR CUSTOMERS' BRANDS

Write for Our Current Price List with detailed offer of . . .

CURRANTS	FIGS	FRUIT SALAD
SULTANAS	APRICOTS	GLACE CHERRIES
RAISINS	PEACHES	PEEL
DATES	PRUNES	COCONUT
etc	etc.	

MANUFACTURING QUALITIES of:- Currants, Sultanas, Dates, Candied Peel.

TEM-CON



The Accurate

Adaptable and

Inexpensive

Electronic System of

TEMPERATURE and HUMIDITY CONTROL

Sole Manufacturers & Patentees:

P.A.M. LTD.

MERROW · GUILDFORD · SURREY

One of the group of Companies associated with the Southern Areas Electric Corporation Ltd.

To keep heat in or to keep the "cool" in

You may be losing valuable heat, or your cooling chambers may be *letting in* too much heat.

We can 'tailor' the necessary insulating panels and shapes, for the manufacturer or the user, ready to fit without trouble.

We also make hygienic and rigid 'Flexometal' panels—plywood faced with any metal, with the edges sealed, and in any shape.

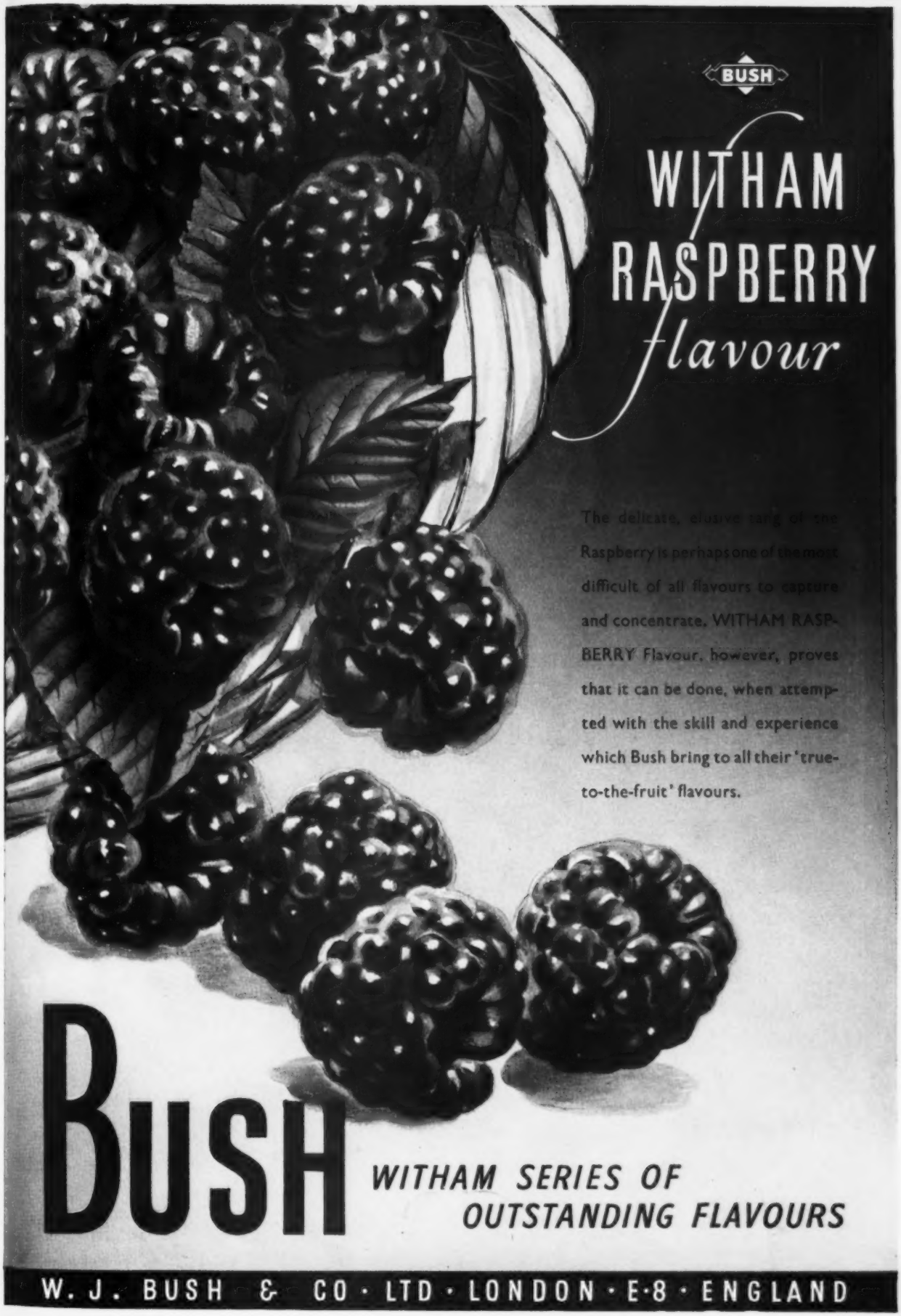
Your enquiries will be welcomed.

FLEXO INDUSTRIES

FLEXO PLYWOOD INDUSTRIES LTD.,
South Chingford, London, E.4

Telephone : SILverthorn 2666 (7 lines)

Printed for the Proprietors, LEONARD HILL LIMITED, and published by them at their Offices, Stratford House, 9, Eden Street, London, N.W.1 by Billing and Sons Ltd., The London Printing Works, Guildford and London, England
Registered for Transmission to Canada including Newfoundland


BUSH
WITHAM
RASPBERRY
flavour
The delicate, elusive tang of the Raspberry is perhaps one of the most difficult of all flavours to capture and concentrate. WITHAM RASPBERRY Flavour, however, proves that it can be done, when attempted with the skill and experience which Bush bring to all their 'true-to-the-fruit' flavours.
BUSH
WITHAM SERIES OF
OUTSTANDING FLAVOURS
W. J. BUSH & CO · LTD · LONDON · E·8 · ENGLAND

JOINT SALES ORGANIZATIONS FOR FLAT-ROLLED MILD STEEL PRODUCTS

RTSC HOME SALES LTD and **RTSC EXPORTS LTD**

PARK STREET LONDON W1

Telephone WAYFAIR 8432 (*Home Sales*) WAYFAIR 8751 (*Export Sales*)